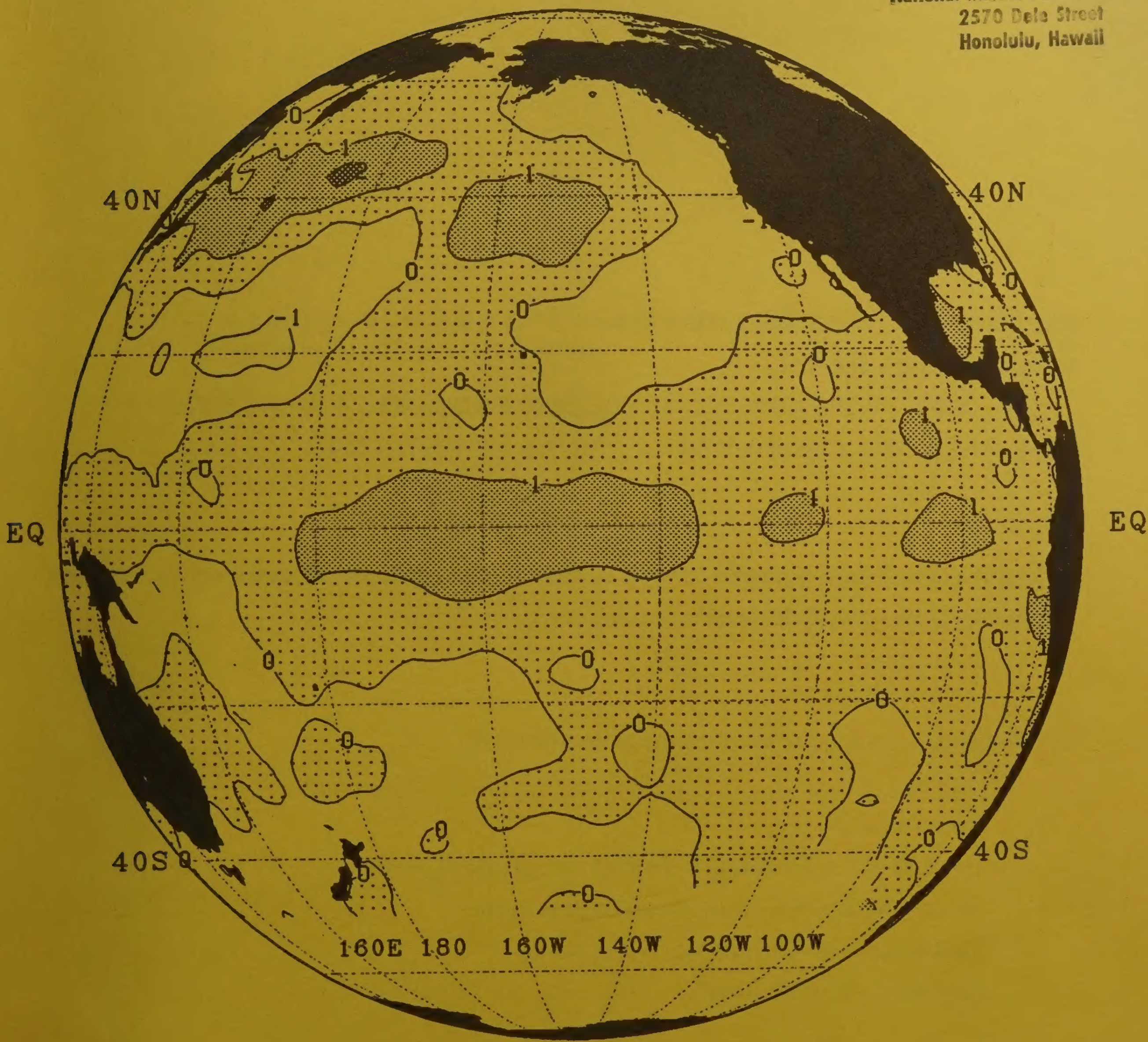
気 象 庁 海 洋 月 報

Monthly Ocean Report

November 1994 (No. 23)



El Niño Monitoring Center
Japan Meteorological Agency

気 象 庁 海 洋 気 象 部 海 洋 課
エ ル ニ ー ニ ョ 監 視 セ ン タ ー

平 成 6 年 1 1 月

気象庁海洋月報は、気象庁海洋気象部海洋課エルニーニョ監視センターで作成されています。
本月報に関する問い合わせは、

〒100　東京都千代田区大手町 1 - 3 - 4　気象庁海洋気象部海洋課エルニーニョ監視センターまで。
電話 (03) 3212-8341 (内線 5134､5135)　　ファクシミリ (03) 3211-3047

Monthly Ocean Report is prepared by the El Niño Monitoring Center, Oceanographical Division, Marine Department, Japan Meteorological Agency.

Correspondence relating to this report may be directed to :

Kunio Sakurai
Head, El Niño Monitoring Center, Oceanographical Division
Marine Department, Japan Meteorological Agency
1-3-4 Ote-machi, Chiyoda-ku, Tokyo 100 Japan
Facsimile: +81-3-3211-3047

表紙は、1994年11月の太平洋の月平均海面水温偏差図です。
陰影部は、平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for November 1994 in the Pcaific Ocean.
Areas of positive anomalies are shaded.

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海況の特徴（１９９４年１１月）

太平洋の海況

太平洋赤道域の海面水温は、日付変更線付近から南米大陸にかけて平年より１℃以上高い海域が広がっていた。また、日付変更線付近の海面水温は、30℃を越えていた。エルニーニョ監視海域（4゜S～4゜N、150゜W～90゜W）の海面水温偏差は、+1.0℃だった（第１表、第１図、第６図）。

赤道域表層の28℃以上の暖水層は、165゜Eから150゜Wにかけて深さ100mに達していた。また、日付変更線から170゜Wにかけては、30℃以上の暖水がみられた。（第３図）。

北太平洋では、40゜Nに沿って日本の東方から170゜Wにかけて平年より１～２℃高かった。また、30～40゜Nの170゜Wから145゜Wにかけては、平年より１℃以上高い状態が続いていた。一方、15～30゜Nの170゜W以西では、平年より低かった。（第１図）。

日本近海の海況

日本近海は、日本海西部及び南西諸島周辺で平年より低いほかは、全般に平年より高く、特に、三陸沖では2℃以上高かった（第17図）。

黒潮は日本の南岸に沿ってほぼ直進し、房総半島沖を東に流れていた（第20図）。

本州東方の親潮系の冷水（深さ100mで5℃以下）は、沿岸寄りの分枝は40.3゜N・145.3゜Eまで、沖合の分枝は39.3゜N・147.8゜Eまで、それぞれ達していた（第19図）。

熱帯の気象

熱帯の対流活動は、太平洋西部から海洋大陸付近でかなり不活発となり、インド洋や日付変更線付近で活発となった。太平洋上の東西循環（ウォーカー循環）は、かなり弱かった。上層雲量や赤道東西風の指数は、すべてエルニーニョ現象発生時にみられる特徴を顕著に示した。南方振動指数（ＳＯＩ）は絶対値が小さくなったが、今月も-0.6と負の値が続いた。（第１表、第12図、第13図）。

［気象庁長期予報課提供］

> 気象庁の海洋気象観測船「凌風丸」が世界海洋循環実験（ＷＯＣＥ）の一環として1994年夏季（7～8月）に北西太平洋で観測した表面海水中と洋上大気中の二酸化炭素の濃度の差をiiiページに紹介する。

HIGHLIGHTS November 1994

Pacific

Sea surface temperatures (SSTs) were more than 1°C above normal between the date line and the coastal area of the South America. SSTs were greater than 30°C near the date line. The SST index for region B (Fig. 6) was +1.0°C (Table 1 and Figs. 1 and 6).

The thickness of surface warm water (above 28°C) along the equator was about 100 m from 165°E to 150°W. The warmest water greater than 30°C was observed between the date line and 170°W (Fig. 3).

In the North Pacific, SSTs were 1-2°C above normal along 40°N from east of Japan to 170°W, and continued to be more than 1°C above normal between 30°N and 40°N from 170°W to 145°W. SSTs were below normal between 15°N and 30°N west of 170°W (Fig. 1).

Seas adjacent to Japan

SSTs in the seas adjacent to Japan were above normal except in the western part of the Sea of Japan and around the Nansei Islands. SSTs were notably more than 2°C above normal off Sanriku (Fig. 17).

The Kuroshio flowed straight along the south coast of Japan, then flowed eastward off the Boso Peninsula (Fig. 20).

The Oyashio cold water (below 5°C at a 100 m depth) extended southward to 40.3°N, 145.3°E and 39.3°N, 147.8°E, respectively (Fig. 19).

Atmospheric conditions in the tropics

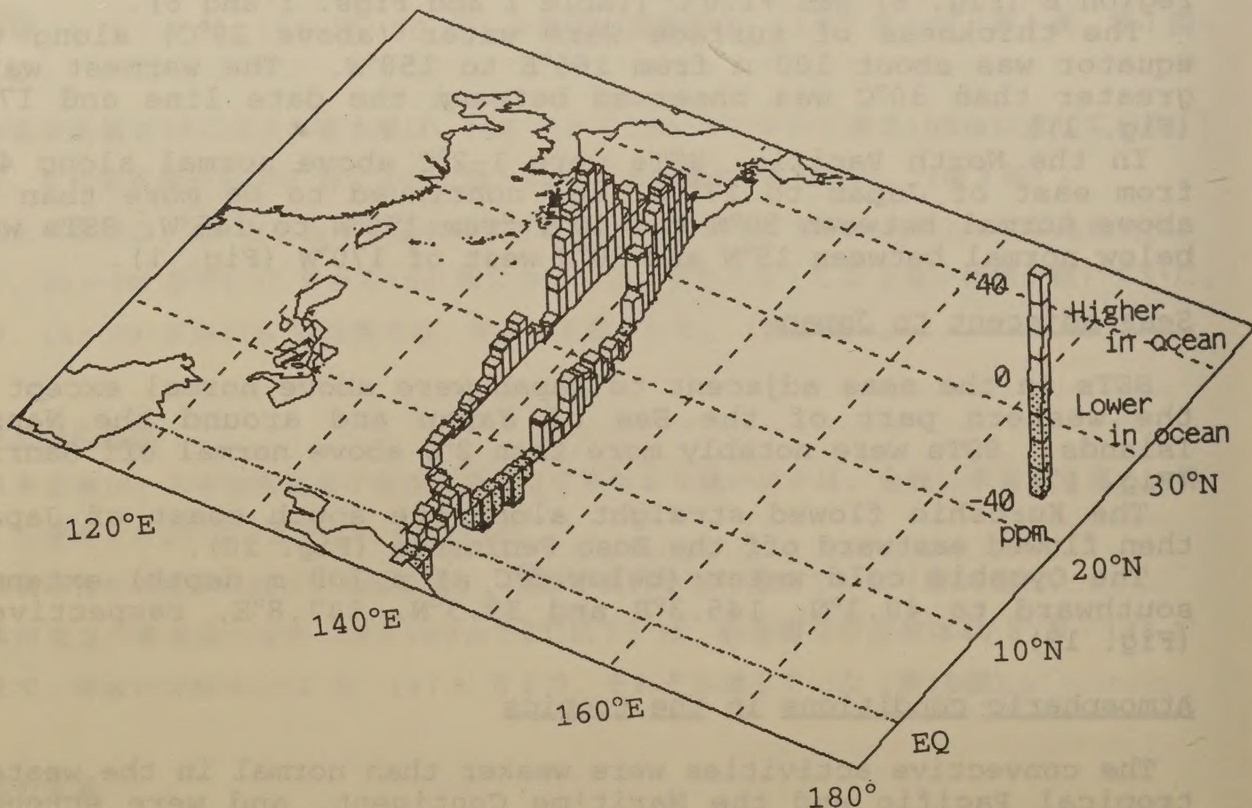
The convective activities were weaker than normal in the western tropical Pacific and the Maritime Continent, and were stronger than normal in the Indian Ocean and near the date line. The zonal (Walker) circulation over the Pacific was weaker than normal. The high cloud amount indicies and the equatorial westerly indicies remarkably showed the features of warm episode conditions.

The SOI has been negative value -0.6, although the absolute value was smaller than that of recent months (Table 1 and Figs. 1 and 13).

[Prepared by the Long-range Forecast Division, JMA]

Differences of CO_2 partial pressure in the sea surface water from that of the marine atmosphere in the western North Pacific, observed on board R/V Ryofu Maru of the Japan Meteorological Agency during the summer (July and August) in 1994 as part of WOCE, is shown on page iii.

Differences of CO_2 partial pressure in the sea surface water from that of the marine atmosphere in the western North Pacific



図－A　北西太平洋で観測した表面海水中と洋上大気中の二酸化炭素の濃度の差
（気象庁の海洋気象観測船「凌風丸」による1994年夏季（７～８月）の観測結果）

Fig. A Differences of CO_2 partial pressure in the sea surface water from that of the marine atmosphere in the western North Pacific, observed on board R/V Ryofu Maru of the Japan Meteorological Agency during the summer (July and August) in 1994.

Date		1993 JUN	JUL	AUG	SEP	OCT	NOV	1994 DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
Pacific Sea Surface Temperature (℃)																			
D	(14N～ Eq.)	29.2	29.1	28.9	29.1	29.1	29.5	29.1	28.4	28.5	28.6	29.1	29.4	29.6	29.2	29.3	29.1	29.3	29.3
	(130E～150E)	-0.1	-0.1	-0.2	-0.1	-0.2	+0.3	+0.2	-0.1	+0.2	+0.2	+0.3	+0.3	+0.3	0.0	+0.2	-0.1	0.0	+0.1
A	(4N～ 4S)	29.1	29.1	28.8	29.1	28.8	28.9	28.7	28.2	28.0	28.2	28.4	28.9	29.0	29.2	29.4	29.1	29.2	29.5
	(160E～150W)	+0.6	+0.6	+0.4	+0.8	+0.4	+0.5	+0.5	+0.2	0.0	+0.1	+0.2	+0.4	+0.5	+0.7	+1.0	+0.8	+0.8	+1.1
B	(4N～ 4S)	27.0	25.8	24.9	24.8	25.0	25.2	25.3	25.7	26.1	26.9	27.0	26.8	26.3	25.1	24.6	24.6	25.3	25.6
	(150W～ 90W)	+0.9	+0.6	+0.3	+0.2	+0.4	+0.6	+0.4	+0.3	-0.1	0.0	-0.1	+0.2	+0.2	-0.1	0.0	0.0	+0.7	+1.0
C	(Eq. ～ 10S)	23.3	22.1	21.0	20.8	21.3	21.5	22.8	24.7	26.0	25.3	24.2	23.4	22.2	21.2	20.6	19.9	21.6	22.4
	(90W～ 80W)	+0.6	+0.5	+0.4	+0.5	+0.6	0.0	+0.2	+0.4	+0.3	-0.6	-0.9	-0.5	-0.5	-0.4	0.0	-0.4	+0.9	+0.9
Pacific Sea Level Anomaly (cm)																			
YAP	(10N, 138E)	-2	1	-1	5	8	8	10	7	7	6	2	2	7	9	1	-5	0	
RABAUL	(4S, 152E)	-11	-8	-9	-7	-6	-5	-2	-1	3	4	5	3	1	2	0	-	-	
MAJURO	(7N, 171E)	6	5	3	1	5	2	3	2	2	3	5	1	-2	-1	0	0	-1	
TARAWA	(1N, 173E)	6	4	7	4	6	2	1	6	-1	6	6	7	6	9	-	14	10	
CHRISTMAS	(2N, 157W)	-1	-2	-1	-1	-2	-1	-7	-3	-7	0	0	1	1	4	7	4	9	
SANTA CRUZ	(1S, 90W)	4	0	0	1	3	0	0	-1	0	-4	-8	-3	1	0	-1	1	4	

第１表（a）エルニーニョ監視指数

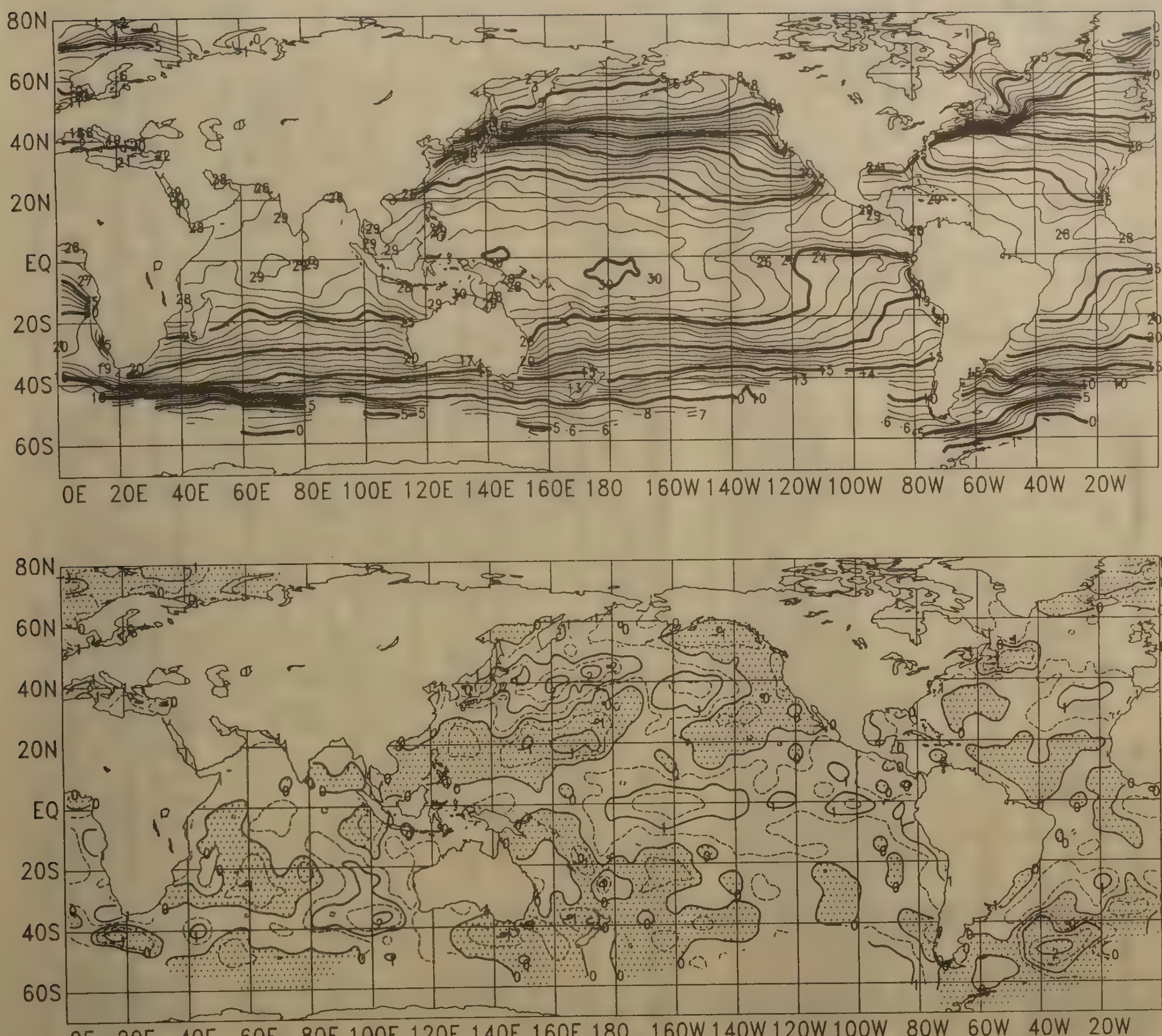
Table 1(a) El Niño monitoring indices. Data sources are the El Niño Monitoring Center, JMA for the sea surface temperature and the SOC of ISLP-PAC, Department of Oceanography, University of Hawaii for the sea level anomaly.

Date	1993 JUN	JUL	AUG	SEP	OCT	NOV	DEC	1994 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
Southern Oscillation Index																		
SOI (TAHITI-DARWIN)	-1.6	-1.0	-1.5	-0.7	-1.4	-0.0	0.2	-0.2	0.1	-0.8	-2.1	-1.4	-1.0	-1.6	-1.8	-1.6	-1.5	-0.6
TAHITI (17.5S, 150W)	-0.6	-1.1	0.0	-0.0	-0.9	0.1	-0.0	-0.1	0.0	-0.1	-1.5	-0.8	-0.9	-1.5	-0.7	-1.5	-1.1	-0.2
DARWIN (12.5S, 131E)	1.3	0.4	2.2	1.4	1.3	0.1	-0.5	0.3	-0.2	1.7	1.2	1.0	0.3	1.0	2.0	1.5	1.2	0.9
High Cloud Amount Index																		
HCLD-PH (20N ~ 10N) (110E ~ 140E)	-1.9	-0.5	-0.4	0.7	-0.1	-0.6	1.2	-0.5	-0.5	0.6	0.7	0.2	-0.3	3.5	-0.9	0.2	-0.6	-3.4
HCLD-MC (5N ~ 5S) (110E ~ 135E)	-2.1	-1.0	-1.4	-1.0	-1.5	-0.8	-0.2	-0.4	-0.5	0.8	0.4	0.4	-1.0	-1.1	-1.1	-1.1	-1.9	-1.3
HCLD-DL (5N ~ 5S) (170E ~ 170W)	1.8	1.3	0.3	1.8	1.7	-0.2	0.0	0.0	-0.7	-0.6	0.4	-0.3	-0.3	-0.5	0.4	1.4	0.2	1.9
Equatorial Zonal Wind Index																		
U200-IN (5N ~ 5S) (80E ~ 100E)	0.4	-0.3	-0.5	-2.1	-0.7	-0.8	-1.8	-0.4	-0.8	-1.5	-0.2	-0.3	-0.5	-1.2	-0.6	-0.9	1.1	0.5
U200-CP (5N ~ 5S) (180 ~ 125W)	-0.0	1.1	0.3	-0.3	0.0	-0.5	0.4	0.4	0.8	0.2	-0.3	-0.5	-0.7	0.4	0.0	0.1	-0.9	-0.3
U850-WP (5N ~ 5S) (160E ~ 175W)	0.3	0.1	0.7	-0.0	0.9	-0.4	-0.7	-1.2	-1.0	-0.6	-0.5	-0.3	-0.4	0.1	0.6	0.4	0.9	1.2
U850-CP (5N ~ 5S) (170W ~ 135W)	0.6	-0.8	0.1	0.2	0.4	0.3	-0.5	-0.6	-0.9	-0.2	-0.4	0.2	-0.6	-0.1	0.0	0.3	1.2	1.2
U850-EP (5N ~ 5S) (130W ~ 100W)	0.7	-0.4	0.8	1.0	0.2	0.9	0.2	0.1	-0.4	0.1	-0.5	0.0	-0.5	-1.3	-1.8	0.9	0.8	1.6

第１表（b）エルニーニョ監視指数(続き)

Table 1(b) El Niño monitoring indices (continued).
Data source for these atmospheric conditions is the Long-range Forecast Division, JMA.

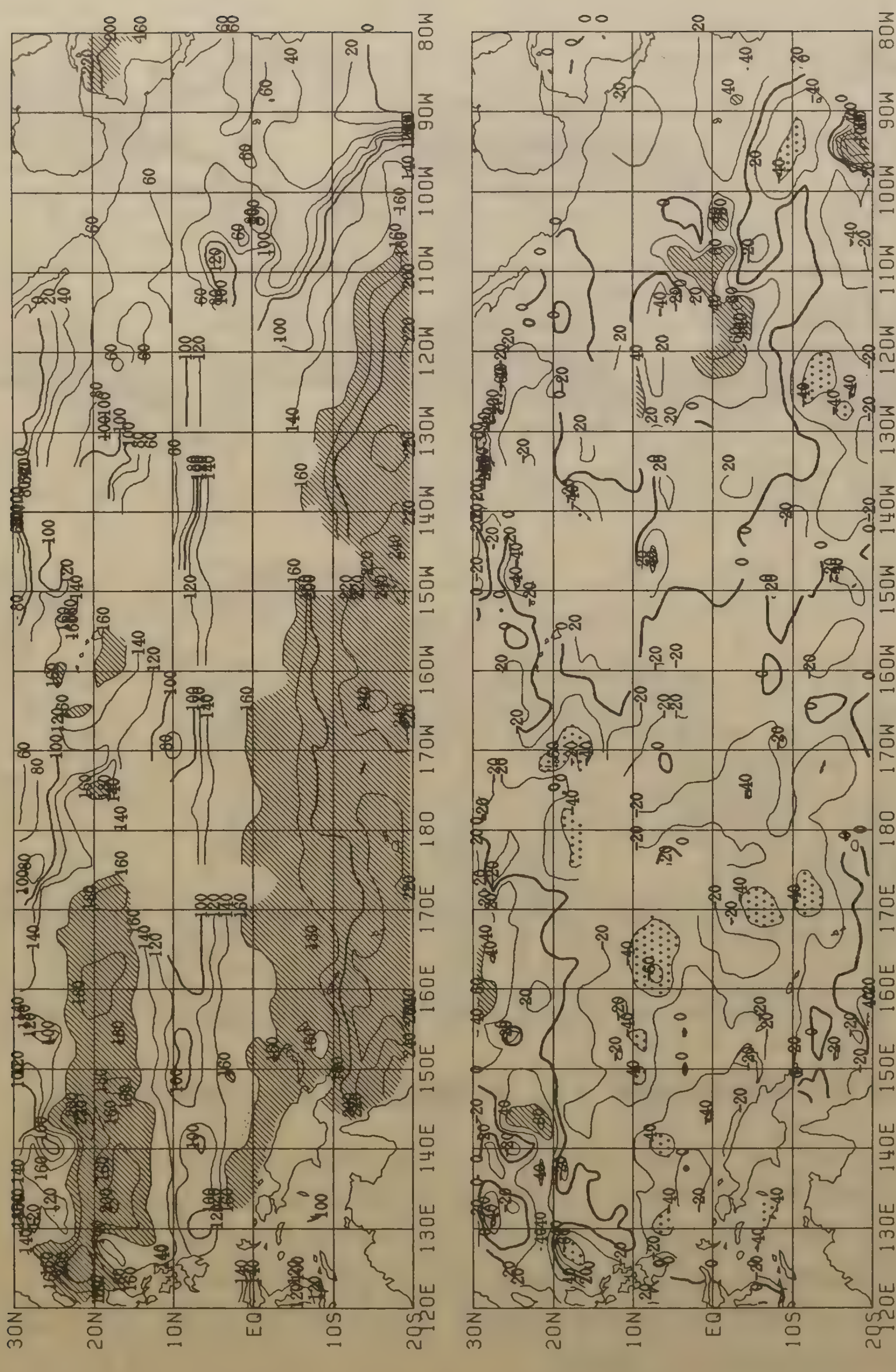
SST & Anomalies in the Global Ocean



第１図　全球月平均海面水温図（上）及び偏差図（下）（1994年11月）

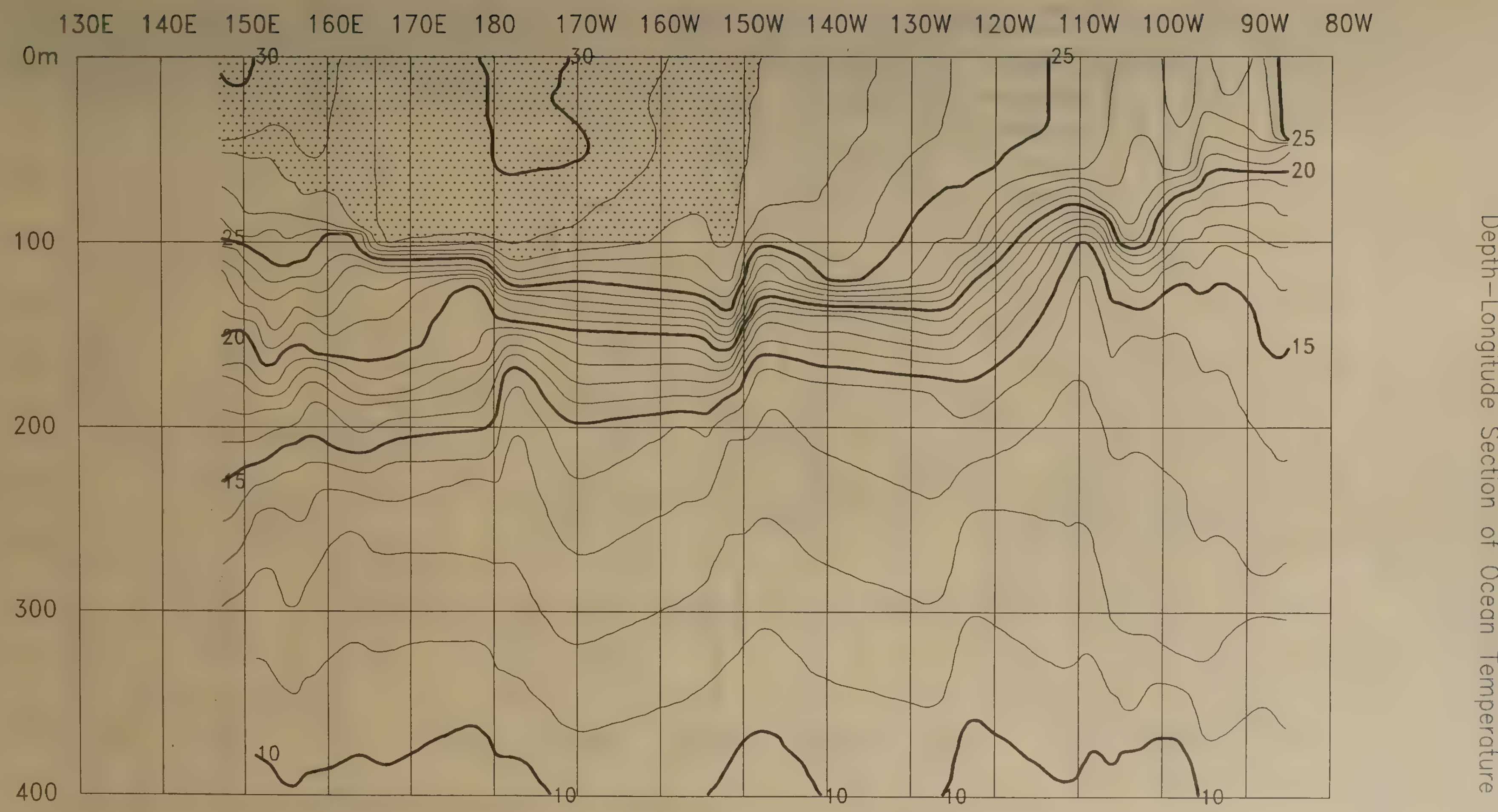
Fig.1　Monthly mean sea surface temperature in the global ocean (top) and anomalies (bottom) for NOV 1994.　Anomalies are computed with respect to the JMA climatology (1961−90) (Climatic charts of sea surface temperatures of the western North Pacific and the global ocean, March 1991).　The Contour interval is 1°C and additional anomaly contours of ±0.5°C are shown as broken lines.　Negative anomalies are stippled.

Depth of 20° C & Anomalies in the Pacific Ocean



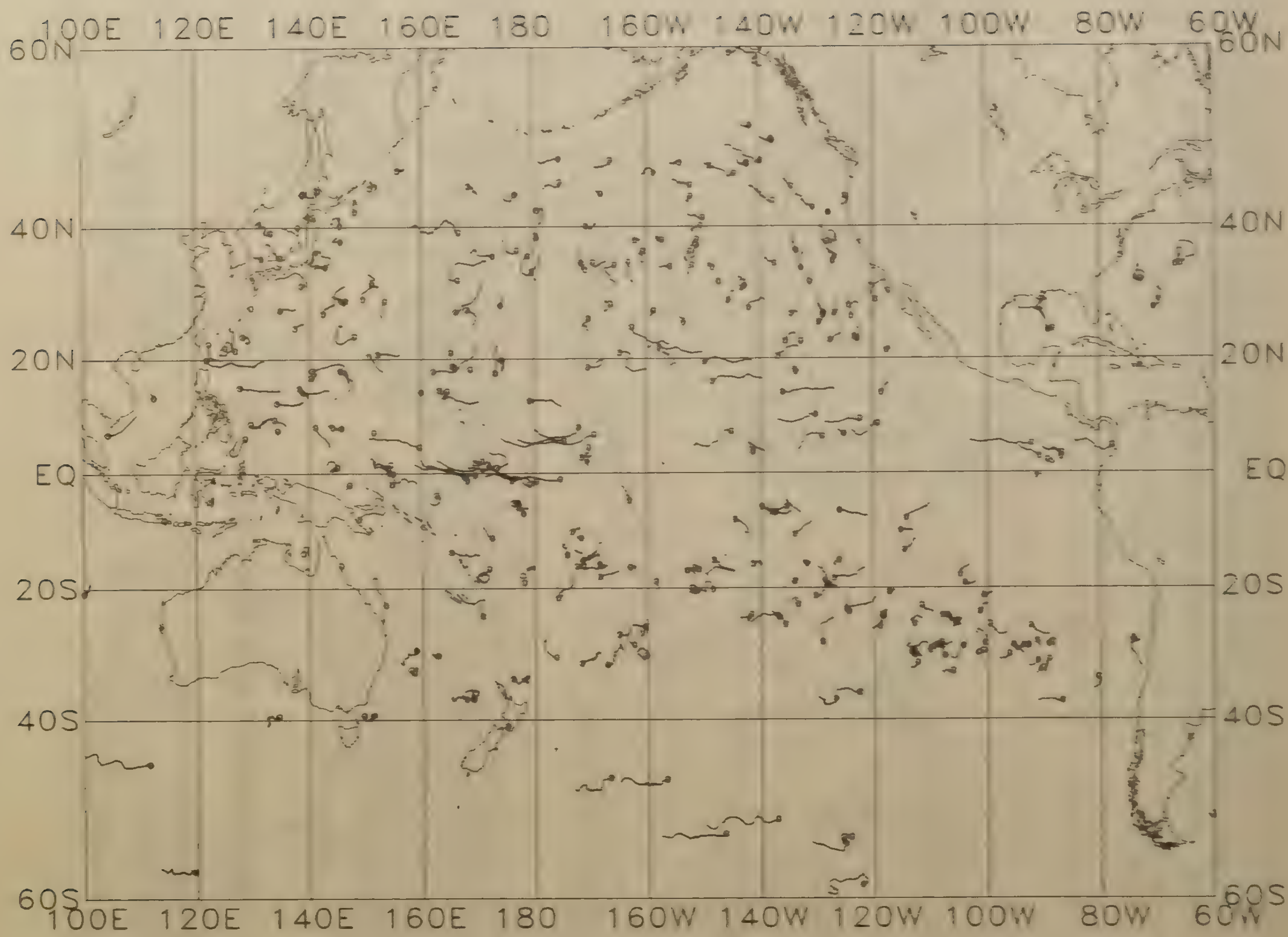
第2図　太平洋表層水温（20℃深度）図（上）及び偏差図（下）（1994年11月）

Fig.2 The depth of a 20° C isotherm in the Pacific Ocean (top) and anomalies (bottom) for NOV 1994. Anomalies are computed with respect to the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA). The contour interval is 20m with shading for values greater than 160m (top), and shading/stippling for values greater/smaller than +40m/−40m (bottom).



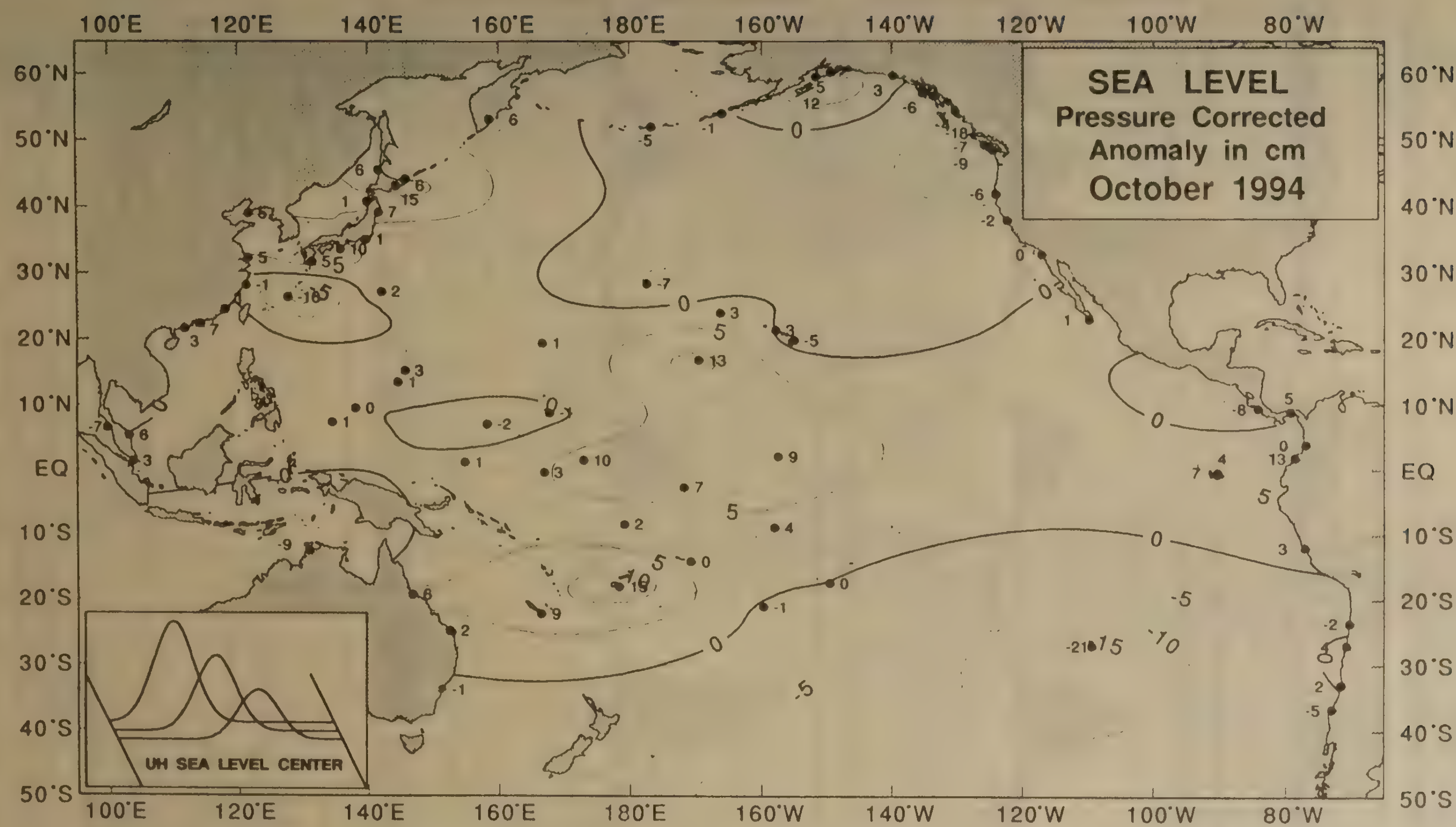
第３図　太平洋赤道に沿う表層水温断面図（1994年11月）

Fig.3 Depth−longitude section of the Pacific Ocean temperature along the equator for NOV 1994. The contour interval is 1° C with spotted shading for values greater than 28° C.



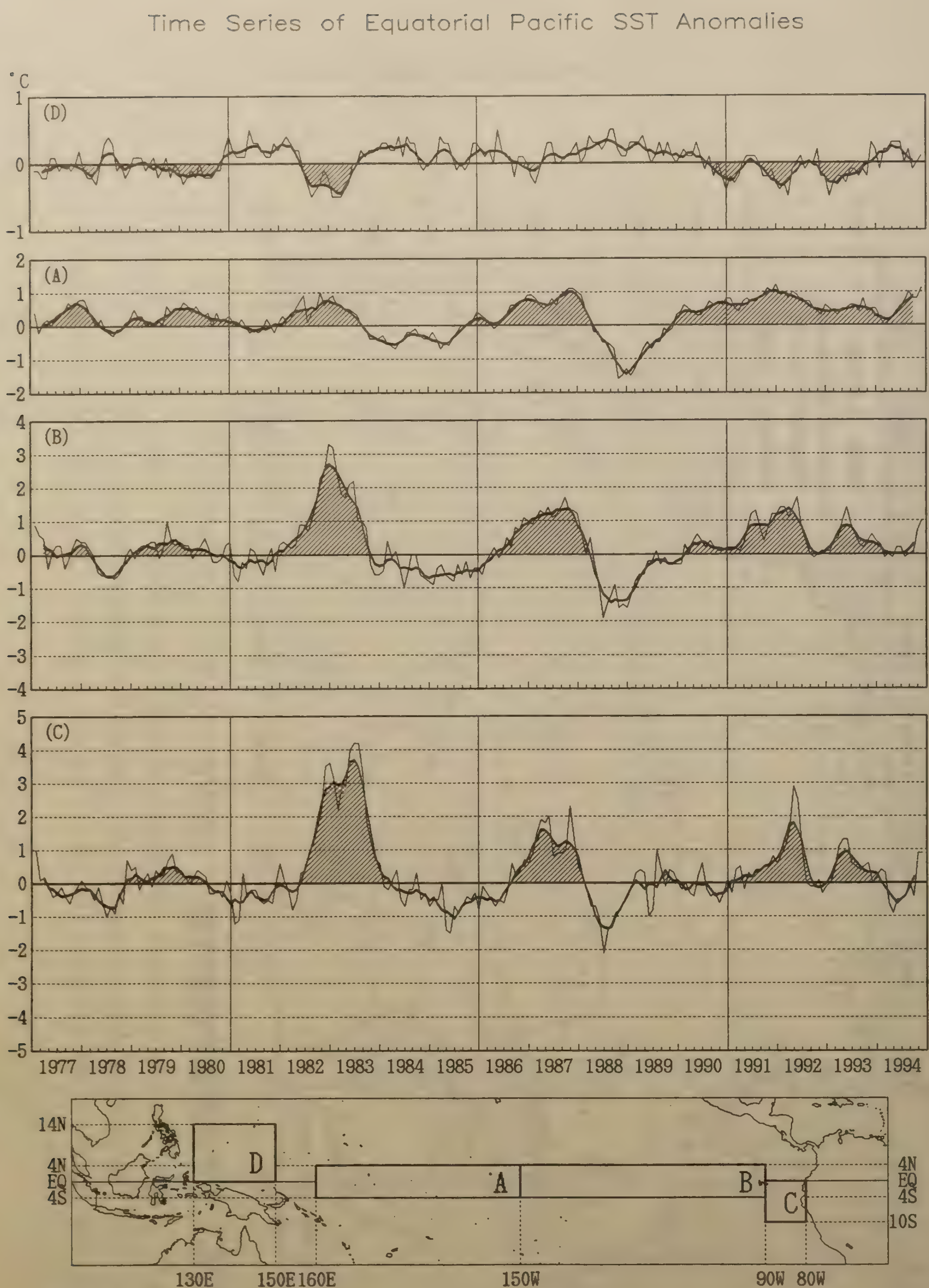
第4図　太平洋ブイ流跡図(1994年11月)

Fig.4 Movements of drifting buoys in the Pacific Ocean during Nov 1994. Each track is one buoy, with the small circle representing the buoy's last position for the month.



第5図　太平洋海面水位偏差図（ 1994年10月 ）

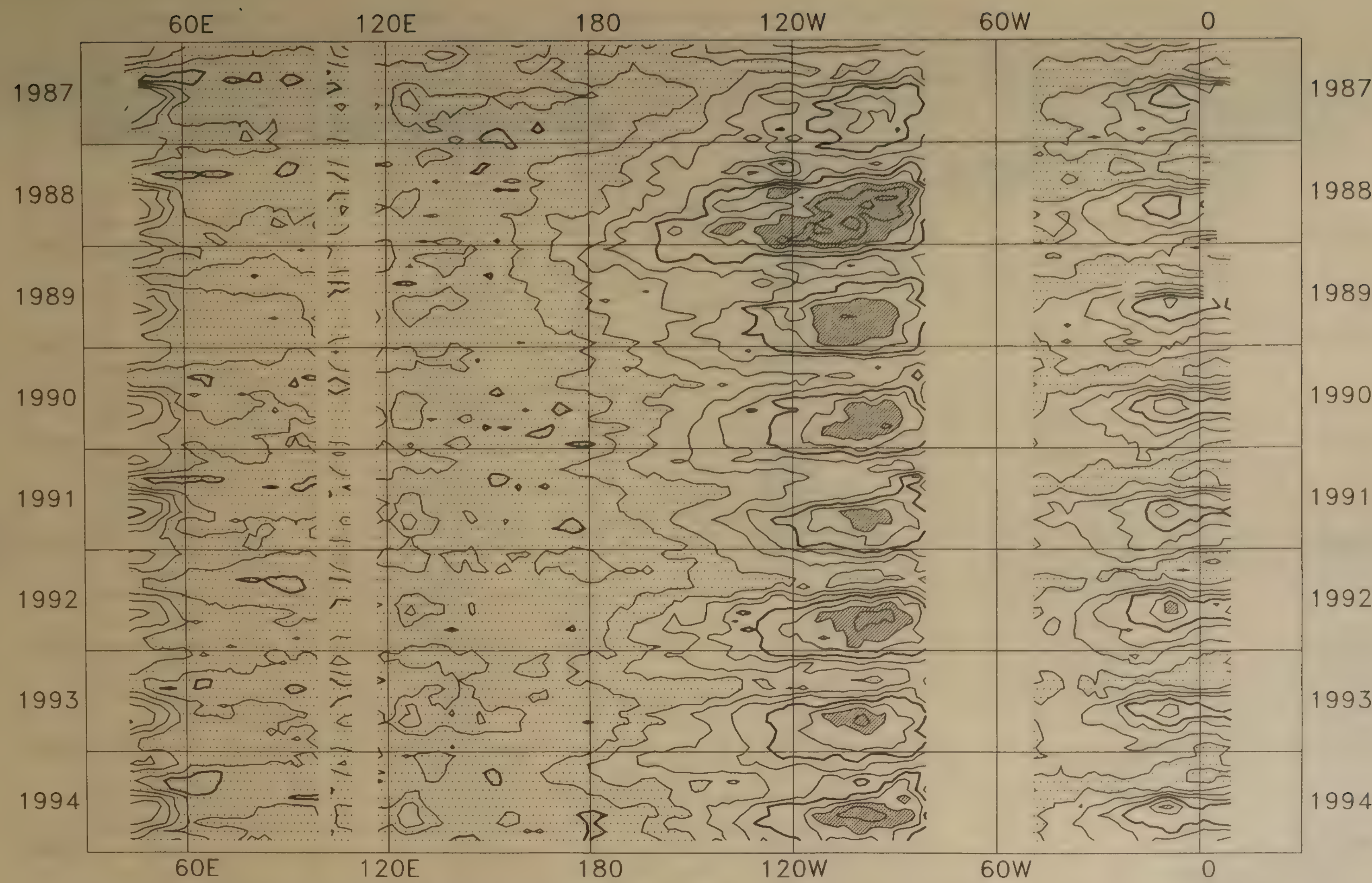
Fig.5　Sea level anomalies obtained from the 1975 to 1986 mean OCT sea level adjusted for atmospheric pressure (OCT 1994).
This figure is prepared by the SOC of ISLP−PAC, Dept. of Oceanography, Univ. of Hawaii.



第６図　赤道太平洋海面水温偏差時系列図

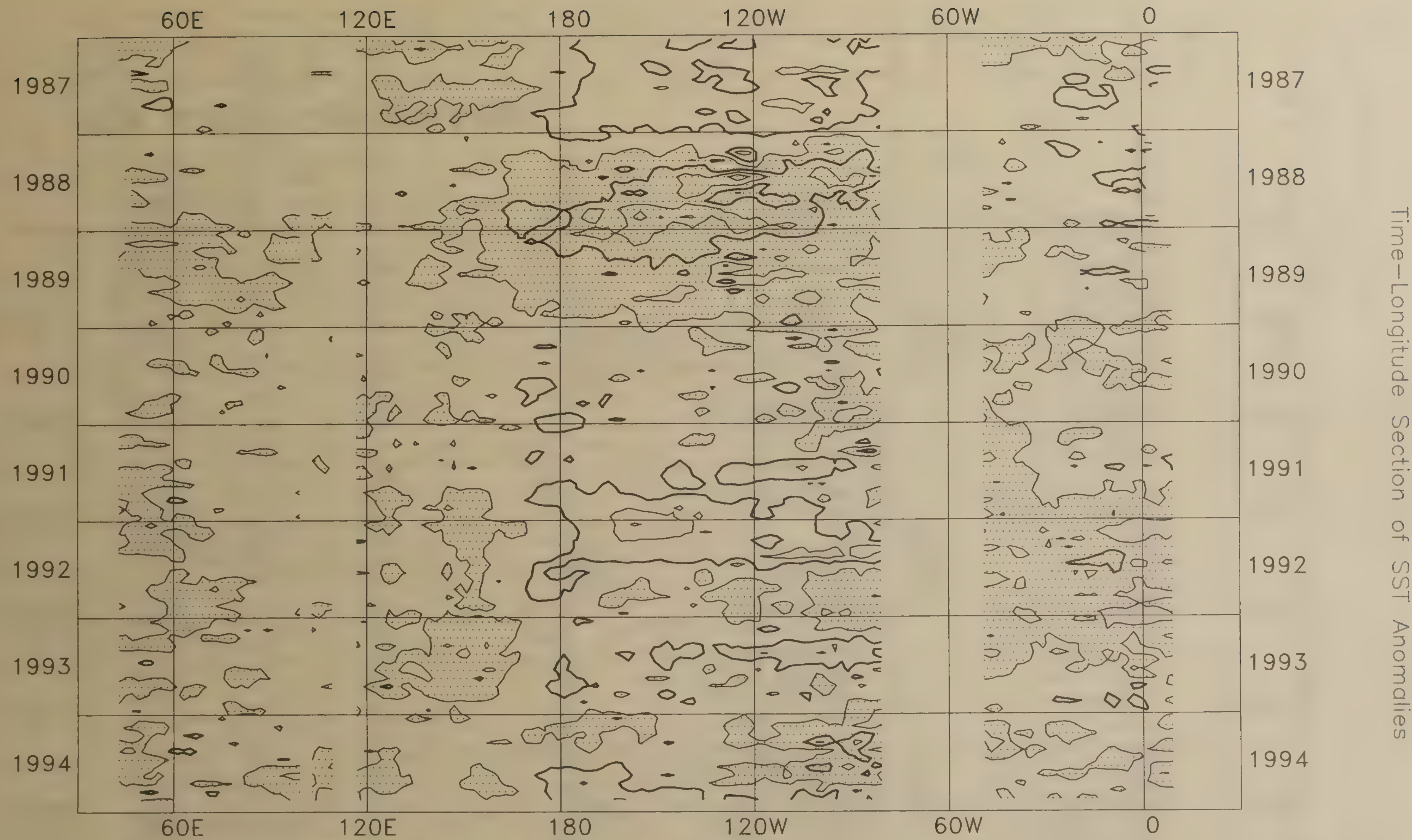
Fig.6 Time series of monthly mean SST anomalies in the equatorial Pacific Ocean for the areas indicated at the bottom of the figure. Thin lines show the monthly values and thick lines their 5 month running mean. Positve anomalies (A,B,C) and negative anomalies (D) are shaded. Anomalies are computed with respect to the JMA climatology (1961−90).

Time-Longitude Section of SST



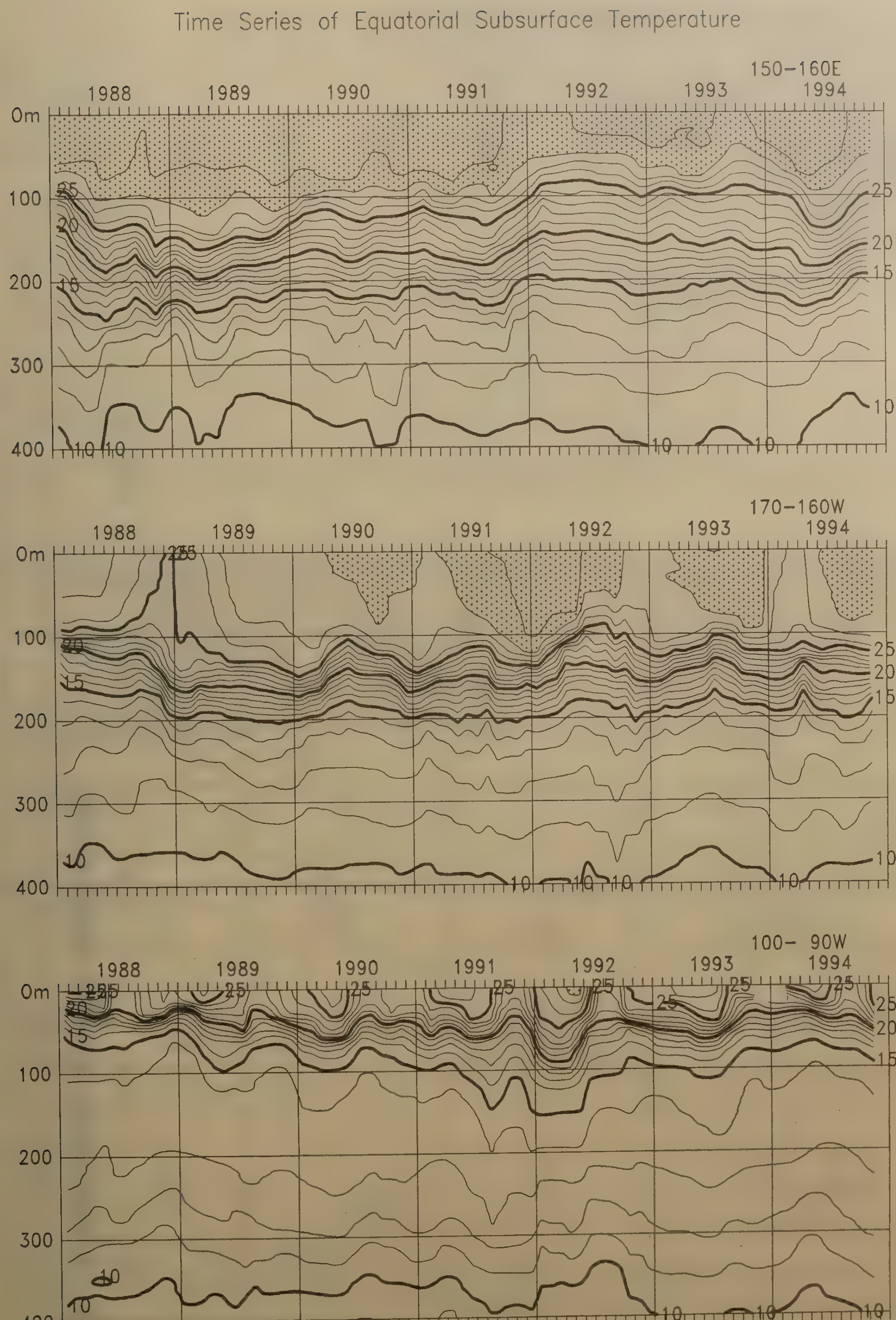
第7図　赤道に沿う海面水温時系列図

Fig.7 Time-longitude section of SSTs along the equator (2° N-2° S) in the global ocean. The contour interval is 1° C, with thick contour lines at 25 and 30° C. SST values greater than 28° C are spotted and values less than 23° C are shaded.



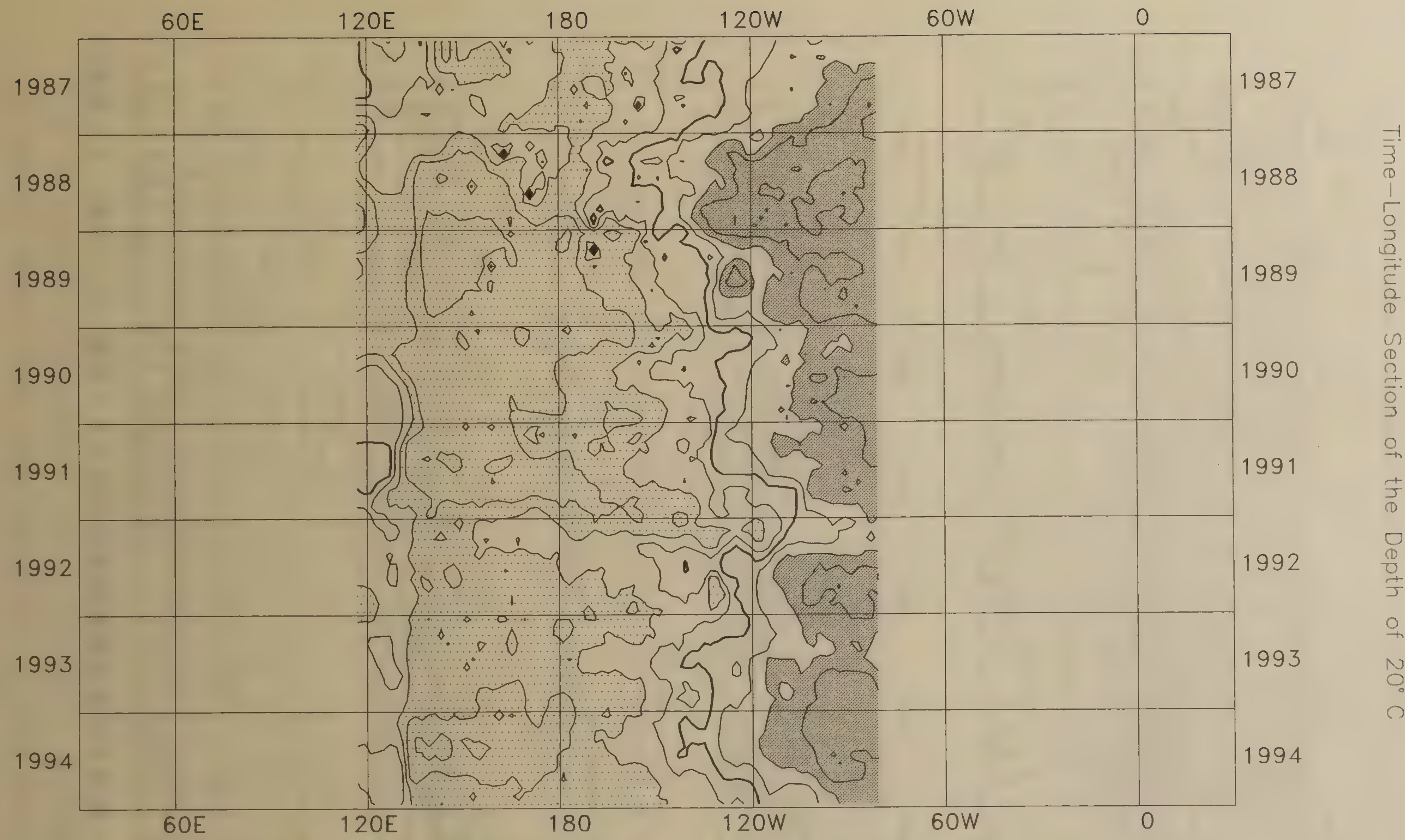
第8図　赤道に沿う海面水温偏差時系列図

Fig.8 Time–longitude section of SST anomalies along the equator (2° N–2° S) based on the JMA climatology (1961–1990). The contour interval is 1° C, with thick contour lines at +1° C and −1° C. Negative anomalies are spotted.



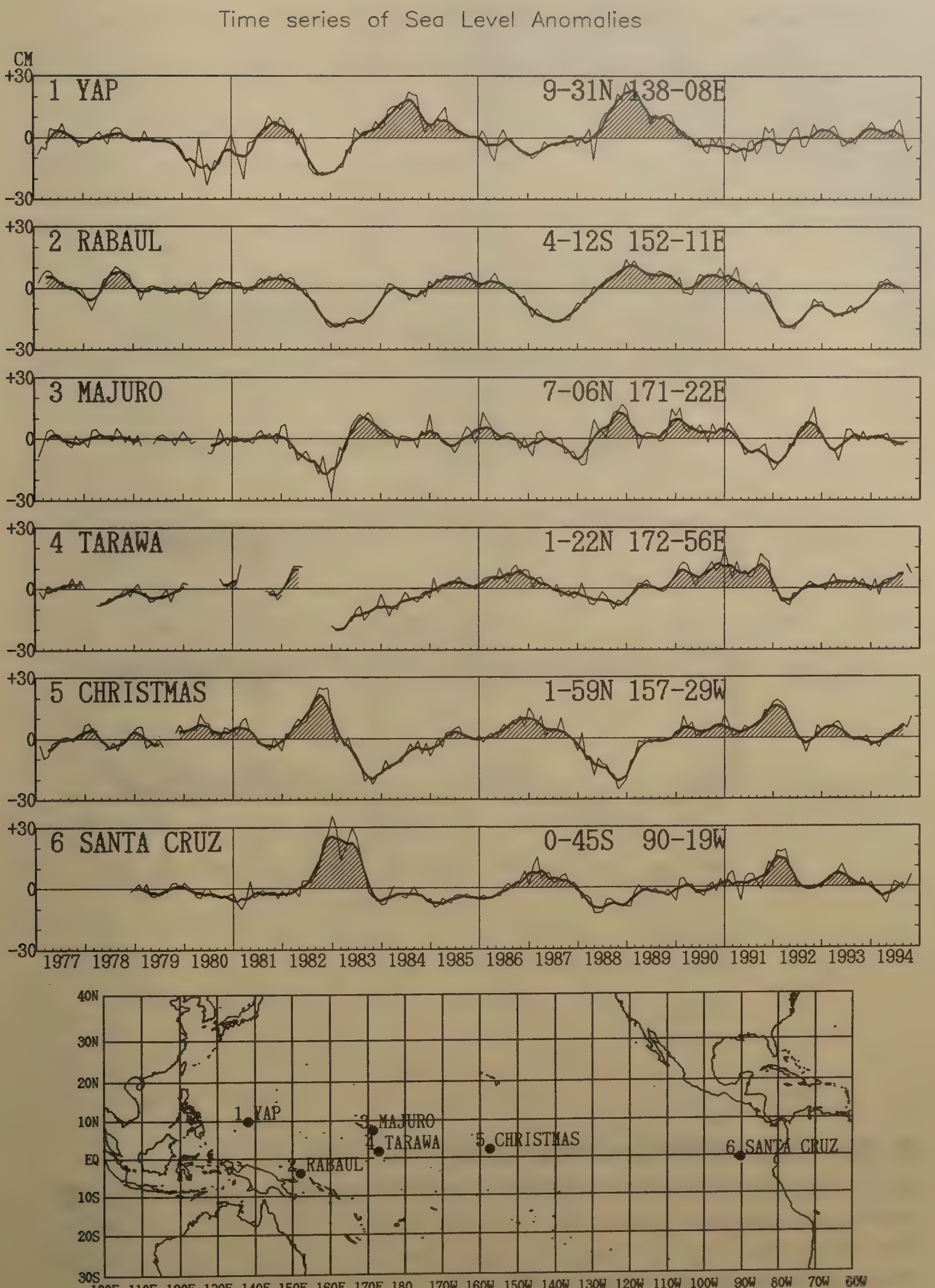
第９図　赤道太平洋表層水温時系列図（上：西部、中：中部、下：東部）

Fig.9 Time series of equatorial (2° N−2° S) subsurface temperature for the western Pacific (top, 150−160° E), the central Pacific (middle, 170−160° W) and the eastern Pacific (bottom, 100−90° W). The contour interval is 1° C with spotted shading for the values greater than 28° C.



第10図　太平洋の赤道に沿う20℃深度時系列図

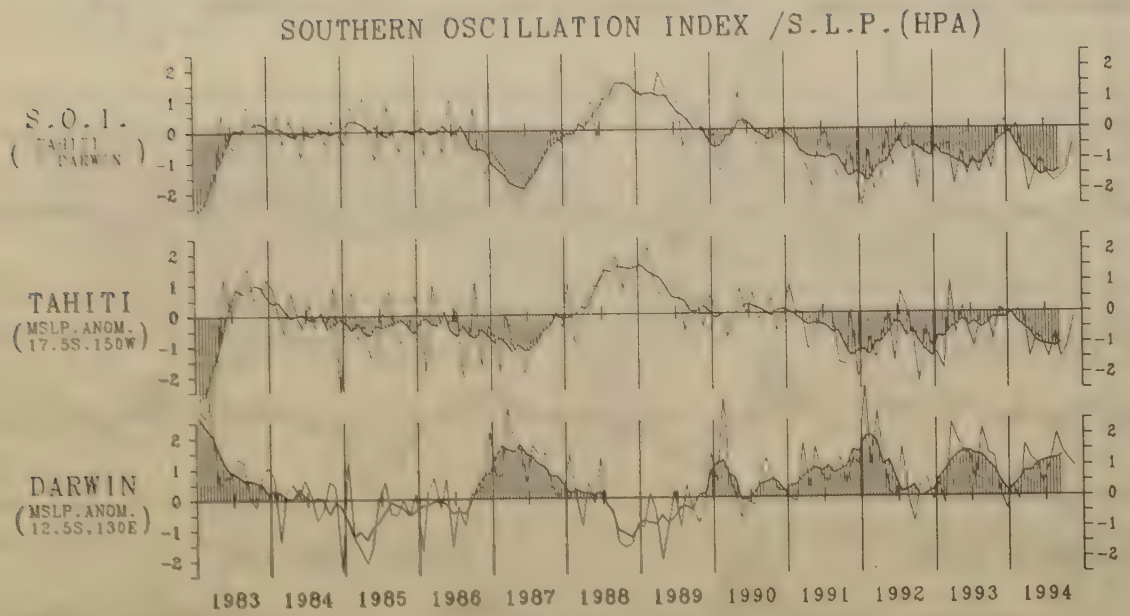
Fig.10 Time–longitude section of the depth of a 20° C isotherm along the equator in the Pacific Ocean. The contour interval is 20m with thick contour lines at 100m. Values shallower than 60m are shaded and those deeper than 140m are stippled.



第11図　太平洋月平均海面水位偏差時系列図

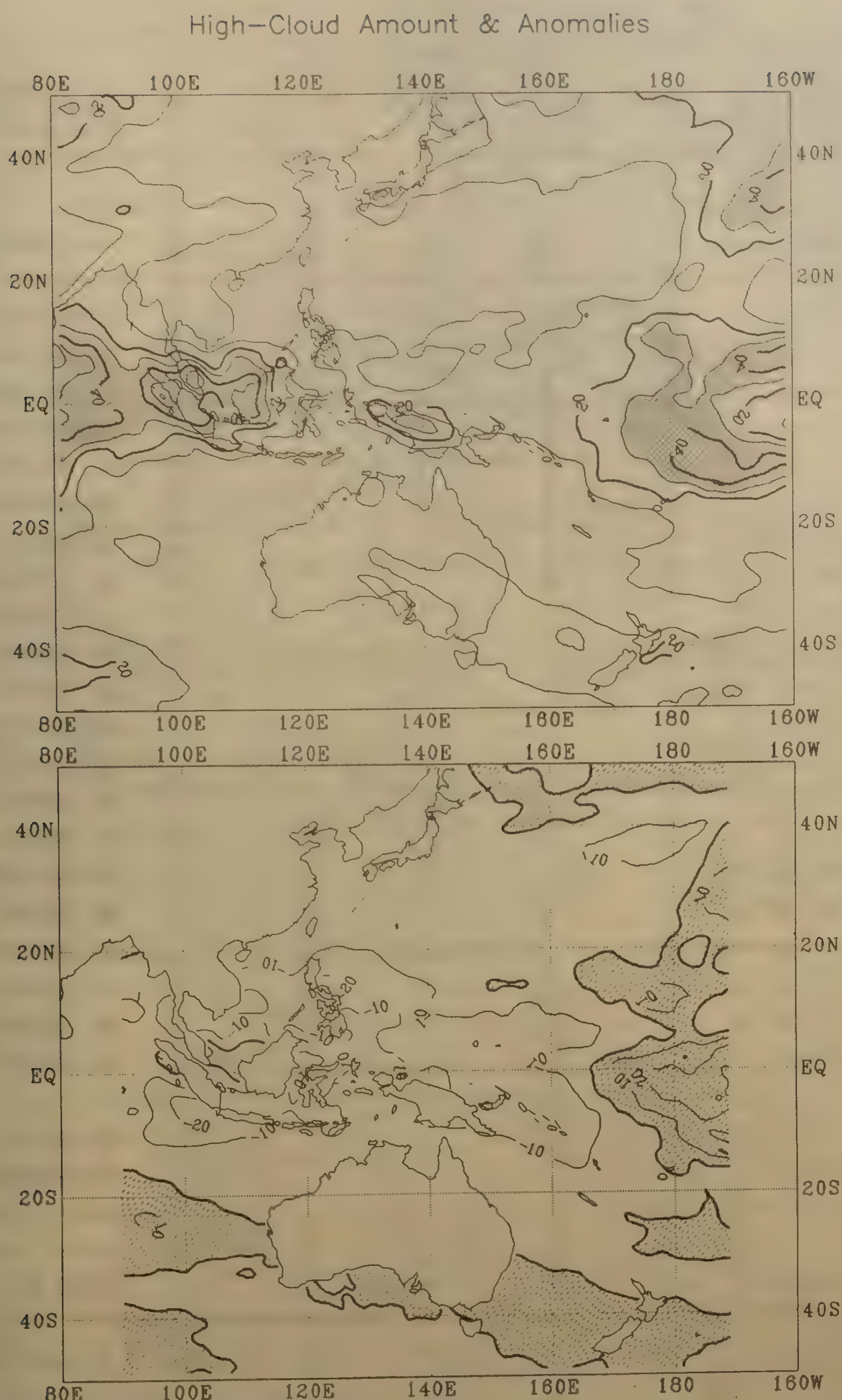
Fig.11 Time series of sea level anomalies based on 1976 to 1990 monthly mean sea level obtained from the stations indicated at the bottom of the figure. Thin lines show the monthly mean and thick lines show their 5 month running mean. Positive anomalies are shaded.

Time series of SOI & Sea Level Pressure Standardized Anomalies



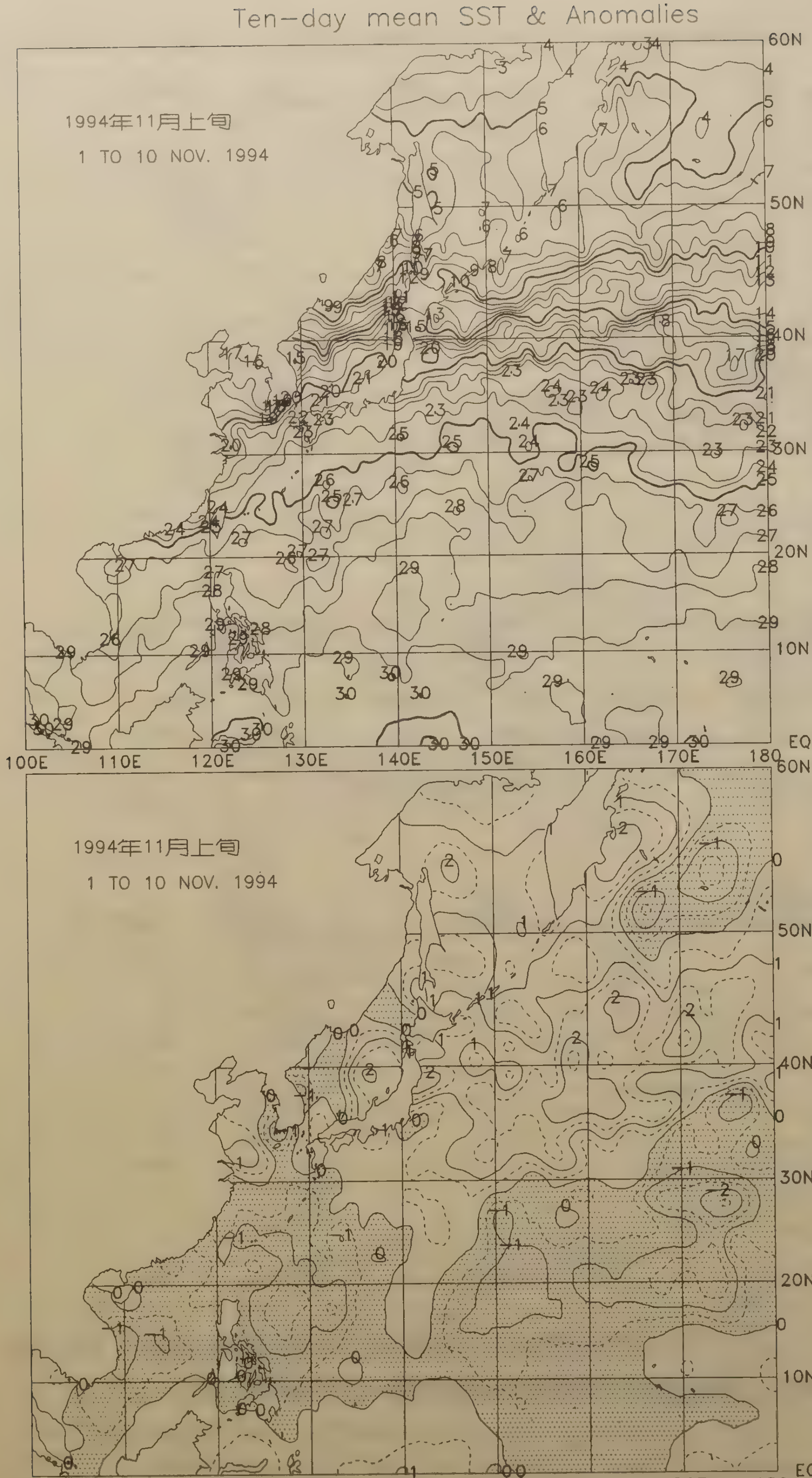
第12図　南方振動指数及び海面気圧偏差時系列図

Fig.12 The Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5 month running mean. Negative values (top, middle) and positive values (bottom) are shaded. Base periods for normals and standard deviations are 1961−1990. This figure is prepared by the Long−range Forecast Division, JMA.



第13図　月平均上層雲量分布図及び偏差図（1994年11月）

Fig.13 Monthly mean of the high-cloud amount (%, top) and its anomalies (%, bottom) in the equatorial Pacific for NOV 1994. The contour interval is 10%. Areas above 30% are shaded (top) and positive anomalies are stippled (bottom). Anomalies represent a departure from the 1978-1990 base period monthly means. This figure is prepared by the Long-range Forecast Division, JMA.



旬平均沿岸水温(℃)
Coastal Water Temperature

地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	24.4	−0.6
那　覇(47936)	24.2	−1.0
名　瀬(47909)	-	-
足摺岬(47898)	22.2	+0.1
潮　岬(47778)	23.1	-
御前崎(47655)	18.9	0.0
八丈島(47678)	22.6	−0.1
館　山(47672)	20.4	+0.2
小名浜(47598)	18.6	+1.1
宮　古(47585)	17.6	+1.8
浦　河(47426)	13.4	+2.4
紋　別(47435)	-	-
稚　内(47401)	11.1	-
寿　都(47421)	14.6	-
江　差(47428)	14.6	-
飛　島(47587)	18.7	+1.2
輪　島(47600)	18.2	+1.1
西　郷(47740)	19.3	-
浜　田(47755)	19.9	-
厳　原(47800)	21.2	-
牛　深(47838)	22.5	-

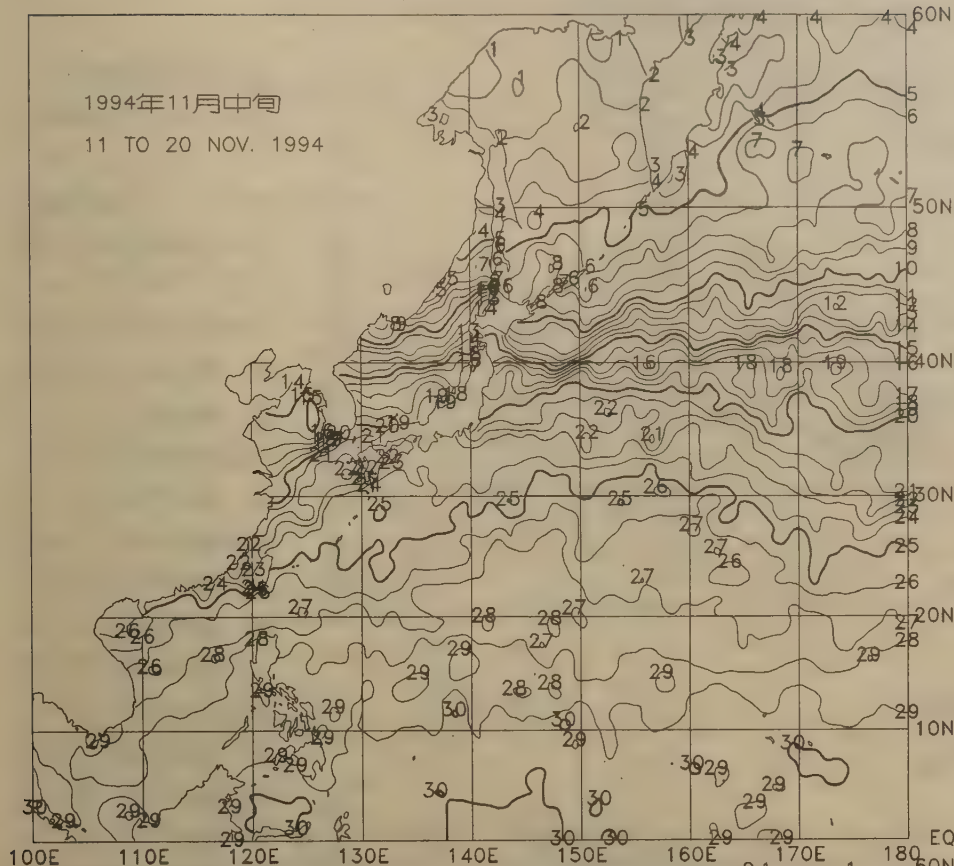
海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

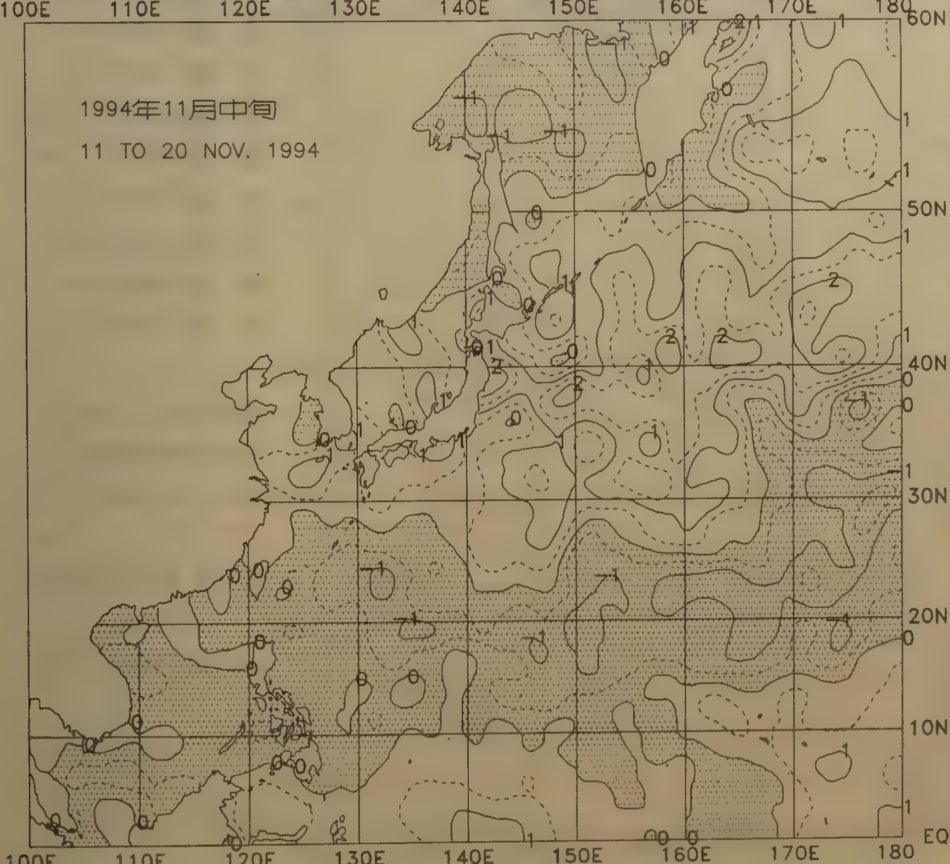
日本海	37.9N,134.5E	18.2
四国沖	29.0N,135.0E	25.3
東シナ海	28.2N,126.3E	25.0

第14図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年11月上旬)

Fig.14 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in NOV 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.

Ten-day mean SST & Anomalies





旬平均沿岸水温(℃)
Coastal Water Temperature

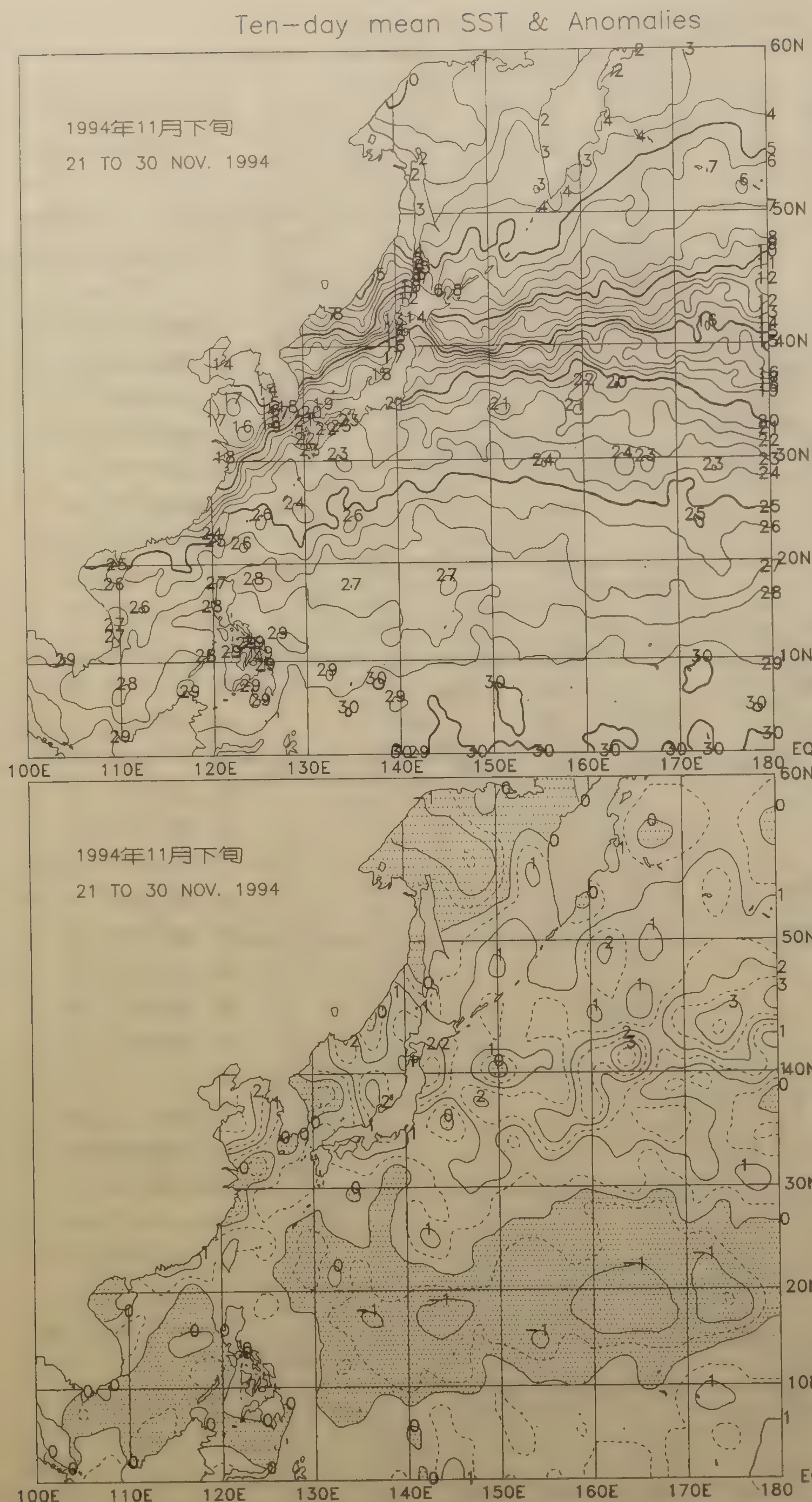
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	25.2	+0.9
那 覇(47936)	25.2	+0.7
名 瀬(47909)	-	-
足摺岬(47898)	22.3	+1.3
潮 岬(47778)	22.8	-
御前崎(47655)	18.4	+1.1
八丈島(47678)	22.3	+0.5
館 山(47672)	20.0	+1.0
小名浜(47598)	18.3	+2.1
宮 古(47585)	15.5	+0.6
浦 河(47426)	10.4	+1.0
紋 別(47435)	-	-
稚 内(47401)	8.3	-
寿 都(47421)	12.9	-
江 差(47428)	11.5	-
飛 島(47587)	16.8	+0.5
輪 島(47600)	16.7	+0.9
西 郷(47740)	18.4	-
浜 田(47755)	19.6	-
厳 原(47800)	20.8	-
牛 深(47838)	22.2	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	17.7
四国沖	29.0N,135.0E	24.4
東シナ海	28.2N,126.3E	24.9

第15図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年11月中旬)

Fig.15 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in NOV 1994. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

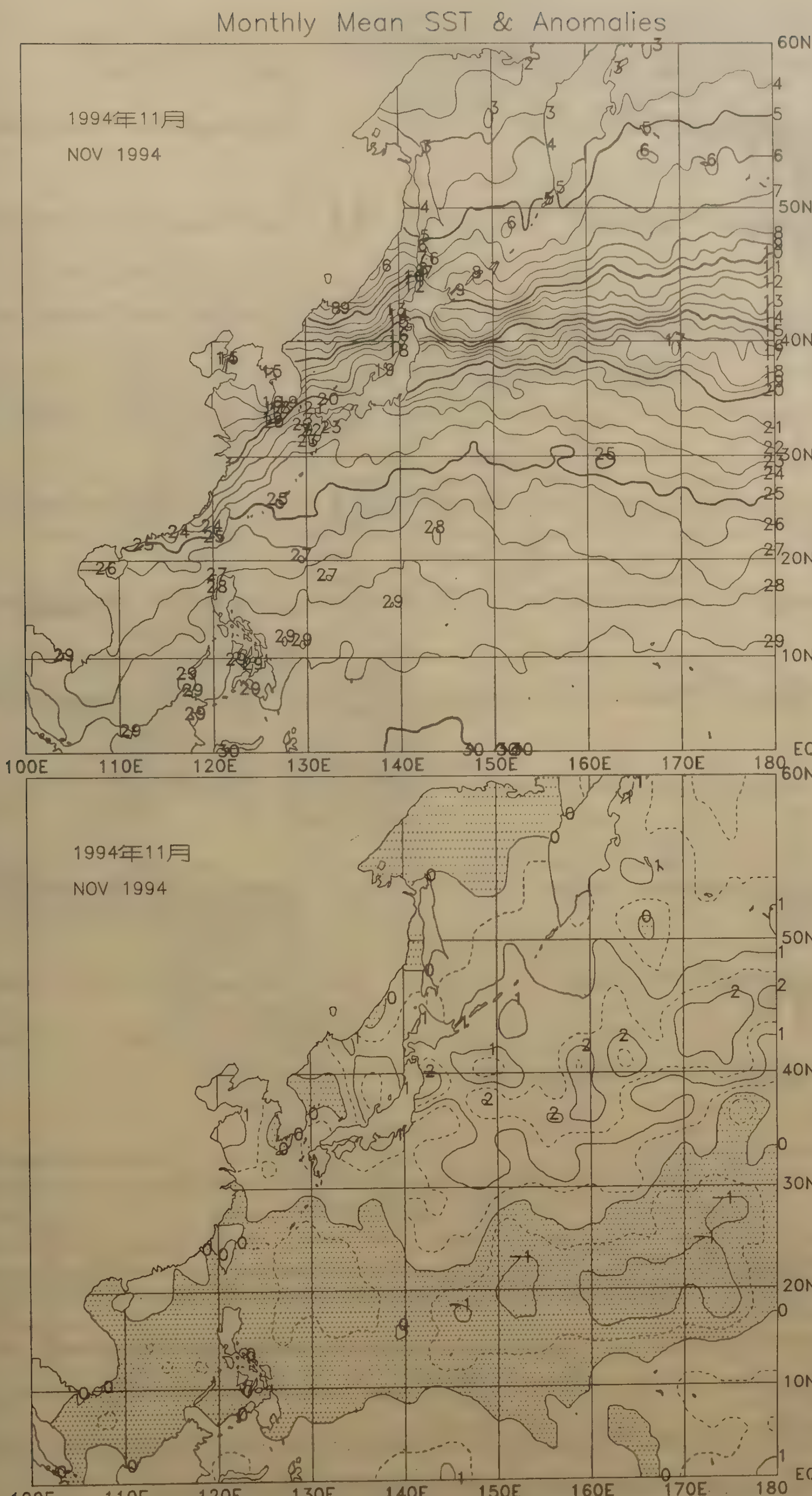
地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	24.3	+1.1
那　覇(47936)	24.2	+0.6
名　瀬(47909)	-	-
足摺岬(47898)	20.8	+0.8
潮　岬(47778)	21.8	-
御前崎(47655)	17.2	+1.3
八丈島(47678)	21.2	+0.3
館　山(47672)	18.4	+0.1
小名浜(47598)	17.0	+2.0
宮　古(47585)	14.8	+1.1
浦　河(47426)	11.4	+4.1
紋　別(47435)	6.0	-
稚　内(47401)	8.1	-
寿　都(47421)	11.9	-
江　差(47428)	12.5	-
飛　島(47587)	15.9	+0.9
輪　島(47600)	15.2	+0.7
西　郷(47740)	18.4	-
浜　田(47755)	18.4	-
厳　原(47800)	19.8	-
牛　深(47838)	21.0	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	16.1
四国沖	29.0N,135.0E	23.6
東シナ海	28.2N,126.3E	24.7

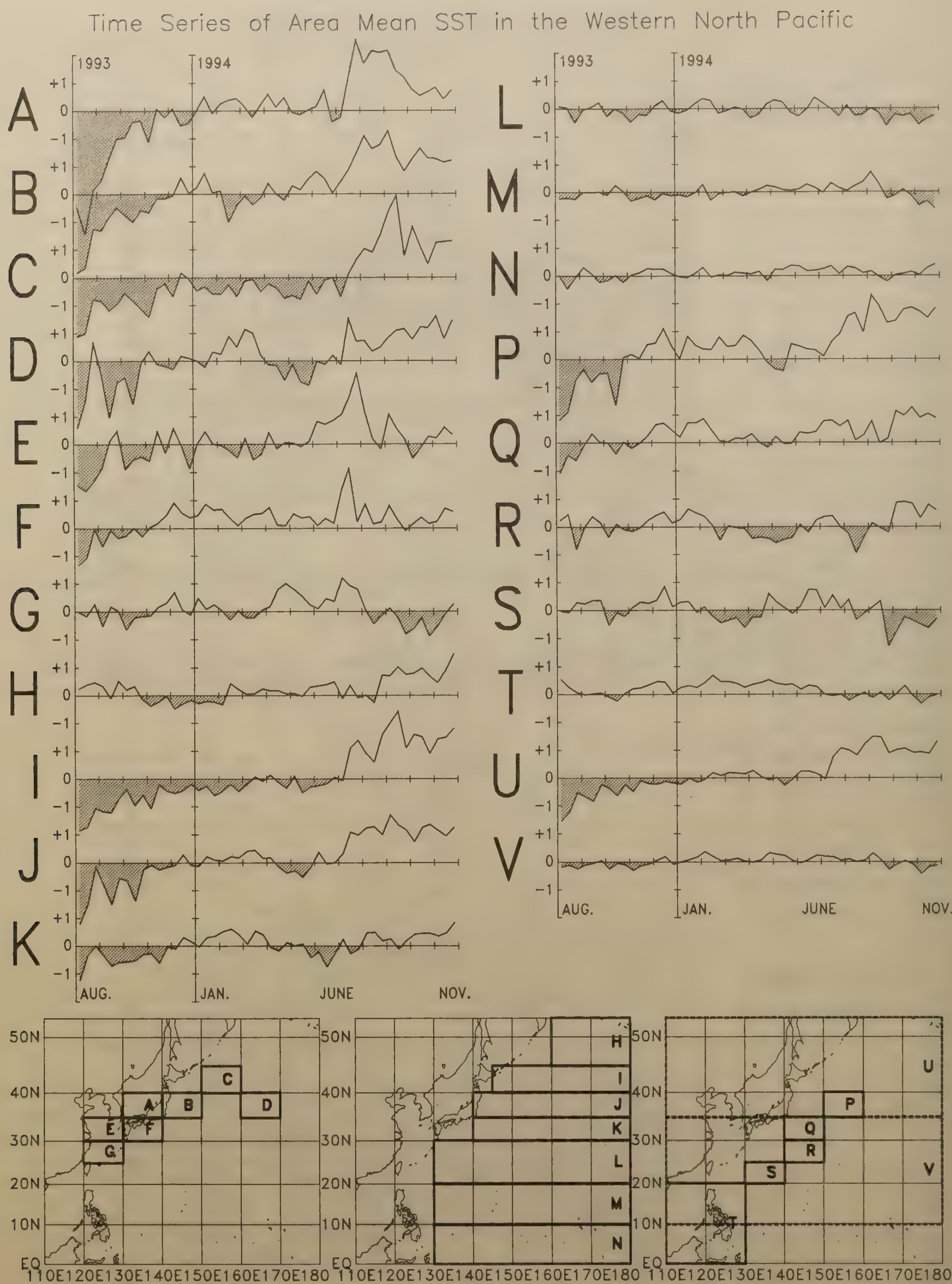
第16図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年11月下旬)

Fig.16 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in NOV 1994. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



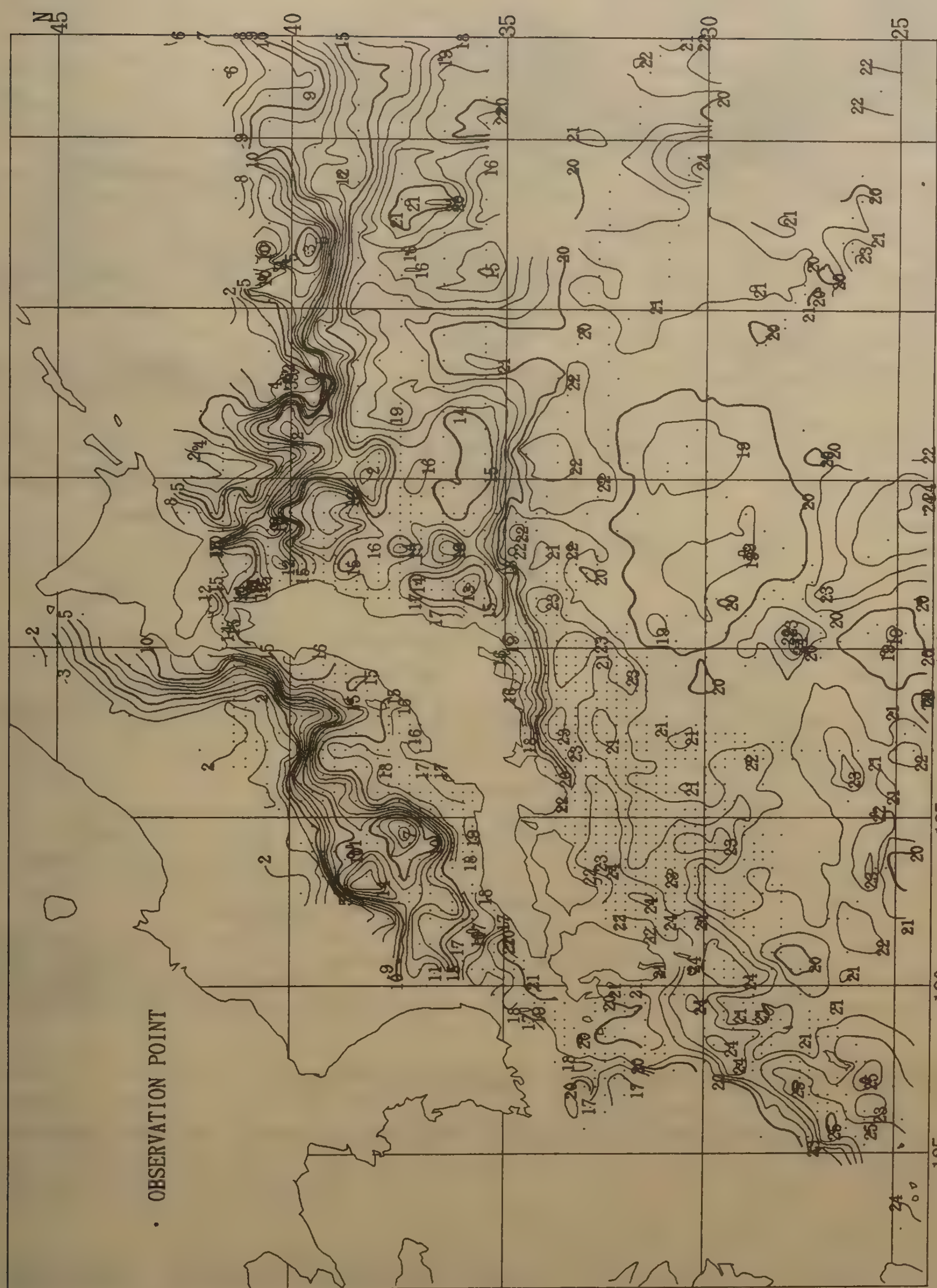
第17図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1994年11月)

Fig.17 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for NOV 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



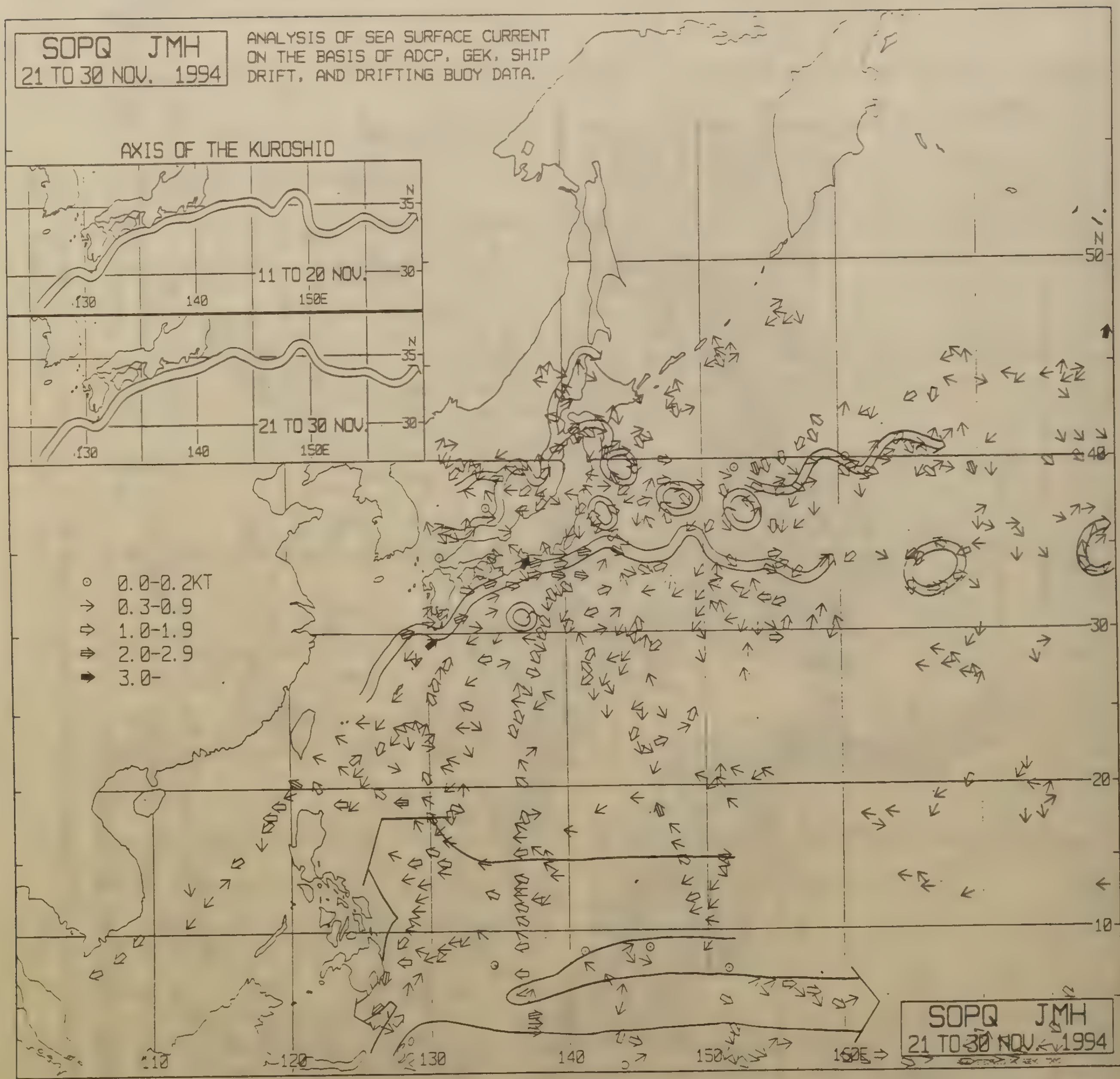
第18図　北西太平洋旬平均海面水温平年偏差時系列図

Fig.18 Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).



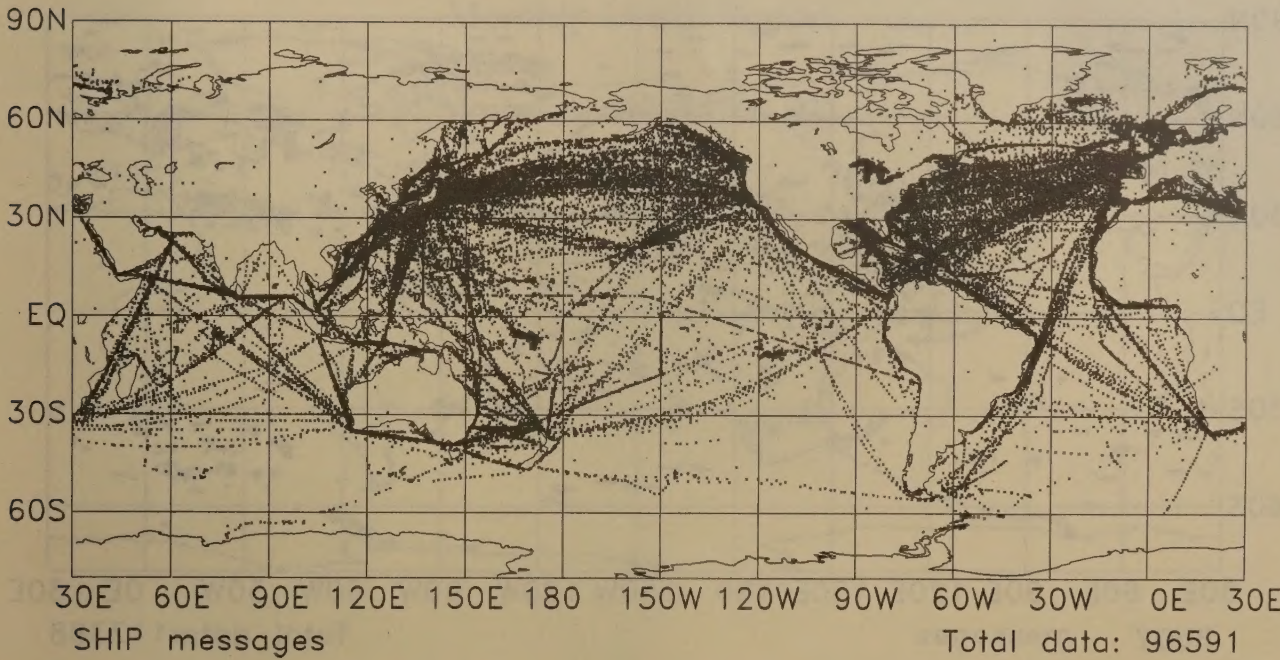
第19図 日本近海表層水温（深さ100M）図（1994年11月）

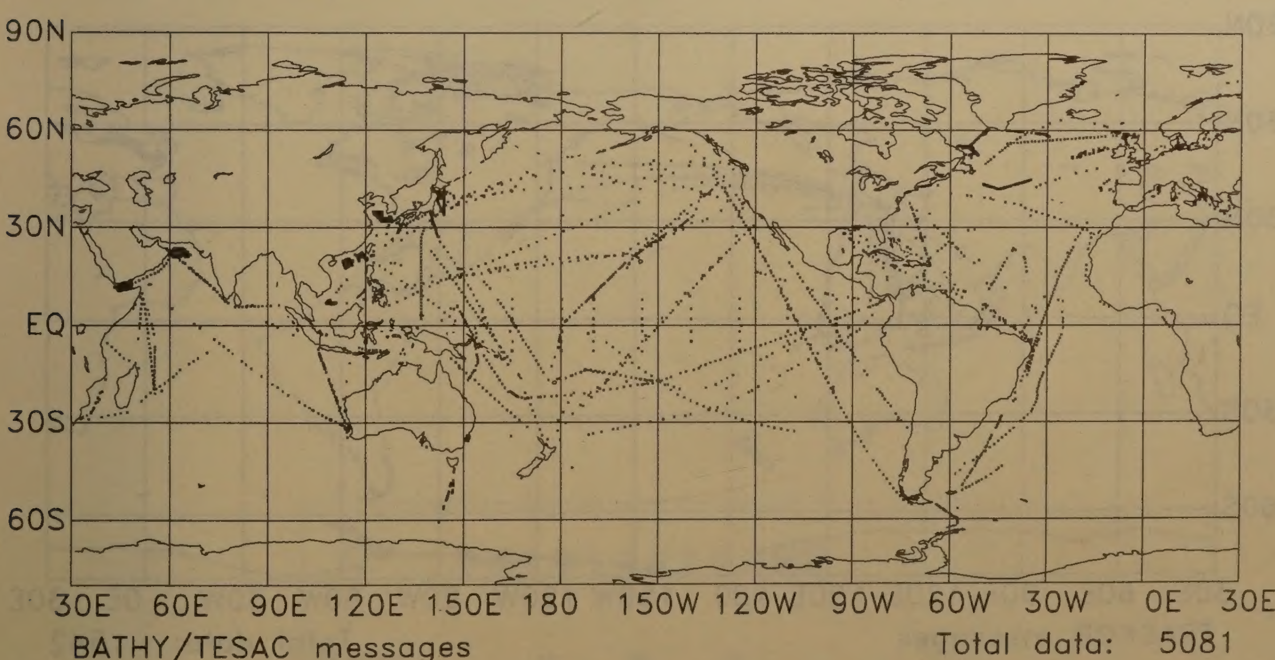
Fig.19 Subsurface (100m) temperatures in seas adjacent to Japan for NOV 1994.



第20図　北西太平洋旬平均海流図（1994年11月下旬）

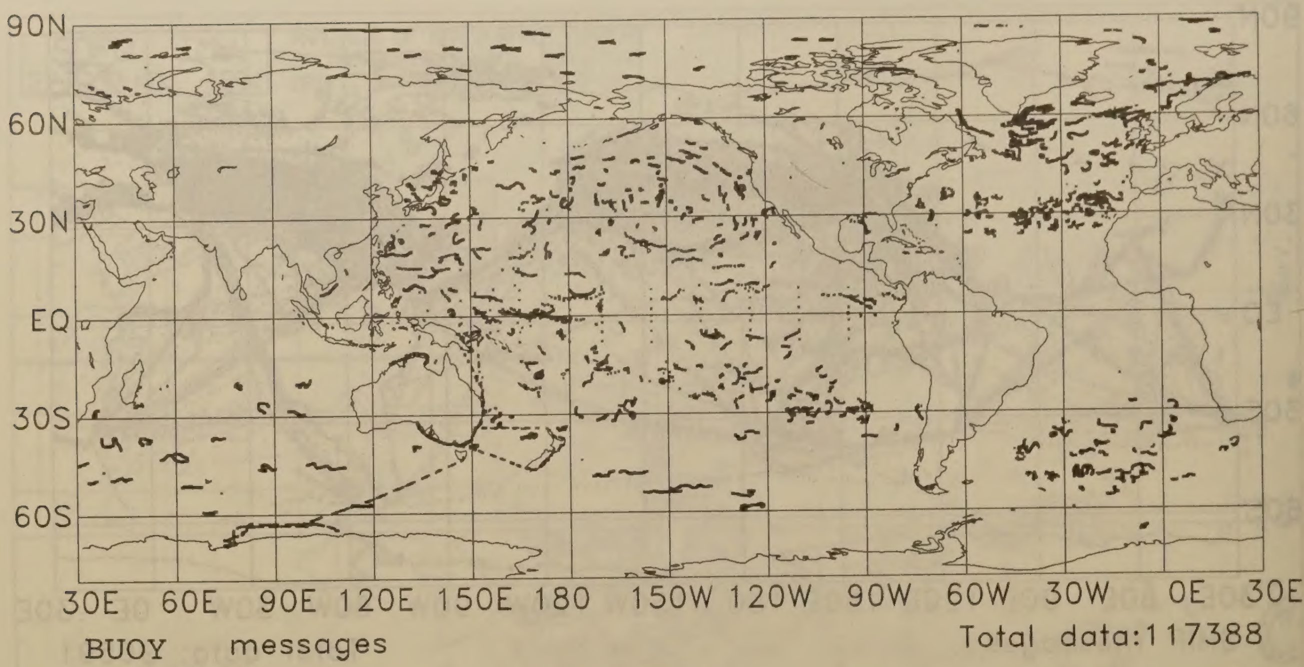
Fig.20 Ten-day analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in NOV 1994. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

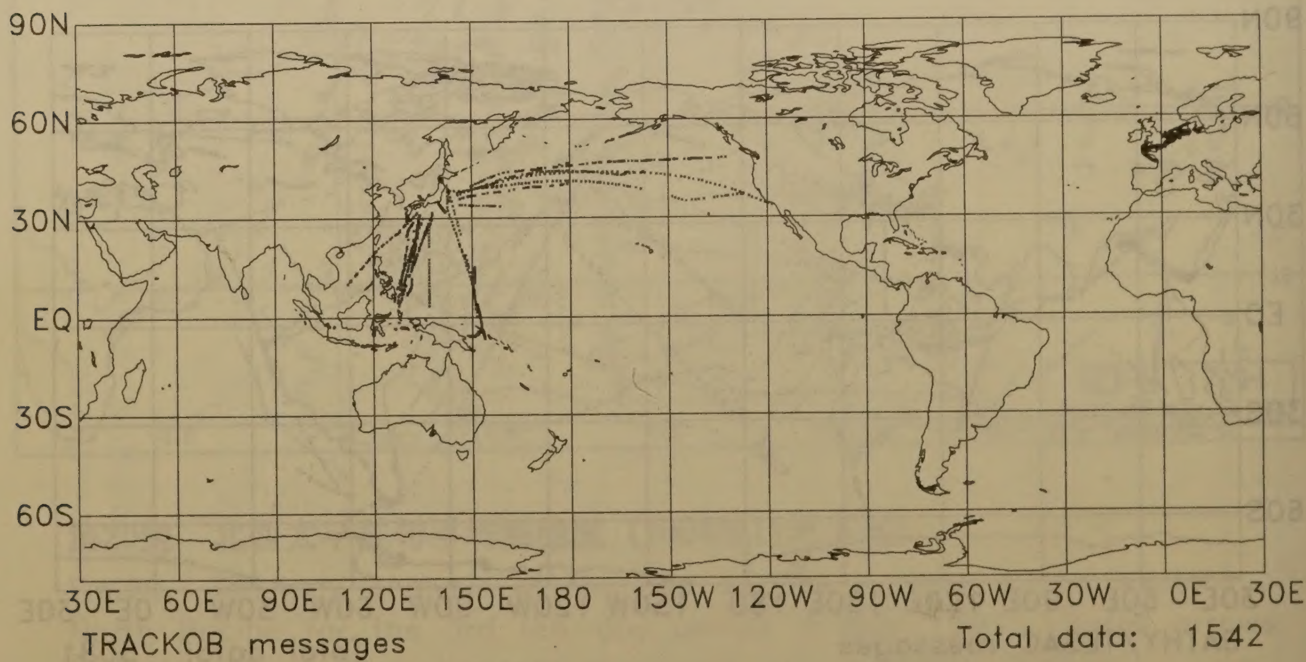




第21-1図　測点分布図(1994年11月)

Fig.21−1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for NOV 1994.





第21-2図　測点分布図(1994年11月)

Fig.21-2 Geographical distribution of DRIFTER messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for NOV 1994.

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